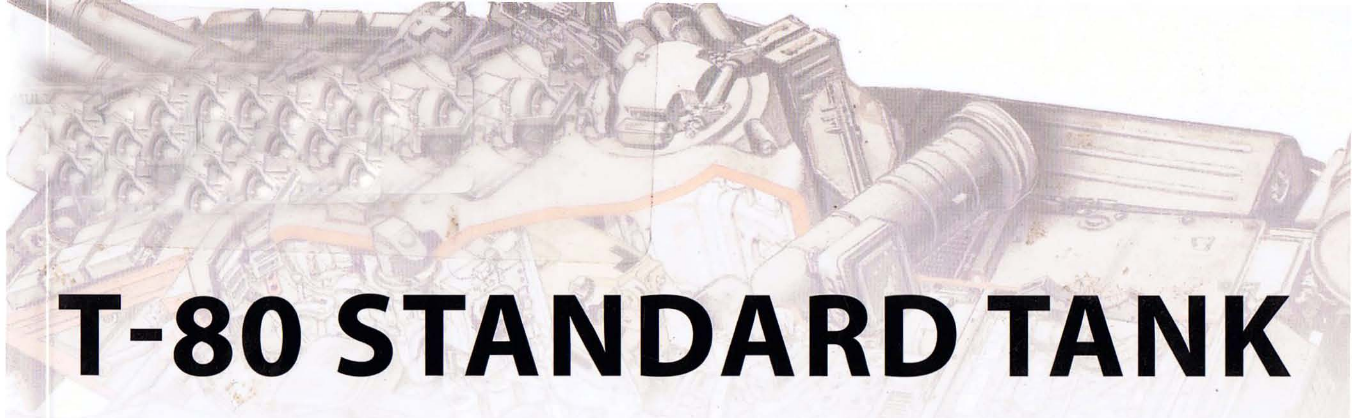


T-80 STANDARD TANK

The Soviet Army's Last Armored Champion

STEVEN J ZALOGA

ILLUSTRATED BY TONY BRYAN

ABOUT THE AUTHOR AND ILLUSTRATOR

STEVEN J ZALOGA was born in 1952, and received his BA in History from Union College and his MA from Columbia University. He has published numerous books and articles dealing with modern military technology, especially armored vehicle development. His main area of interest is military affairs in the former Soviet Union and Eastern Europe in World War II, and he has also written extensively on American armored forces. Steven lives and works in Maryland.

TONY BRYAN is a freelance illustrator of many years' experience who lives and works in Dorset. He initially qualified in Engineering and worked for a number of years in Military Research and Development, and has a keen interest in military hardware – armor, small arms, aircraft and ships. Tony has produced many illustrations for partworks, magazines and books, including a number of titles in the New Vanguard series.

NEW VANGUARD • 152

T-80 STANDARD TANK

The Soviet Army's Last Armored Champion

STEVEN J ZALOGA ILLUSTRATED BY TONY BRYAN

First published in Great Britain in 2009 by Osprey Publishing,
Midland House, West Way, Botley, Oxford, OX2 0PH, UK
443 Park Avenue South, New York, NY 10016, USA
E-mail: info@ospreypublishing.com

© 2009 Osprey Publishing Ltd.

All rights reserved. Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the Copyright, Designs and Patents Act, 1988, no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, electrical, chemical, mechanical, optical, photocopying, recording or otherwise, without the prior written permission of the copyright owner. Inquiries should be addressed to the Publishers.

A CIP catalog record for this book is available from the British Library

Print ISBN: 978 1 84603 244 8
PDF e-book ISBN: 978 1 84603 865 5

Page layout by: Melissa Orrom Swan, Oxford
Index by Sandra Shotter
Typeset in Sabon and Myriad Pro
Originated by United Graphic Pte Ltd., Singapore
Printed in China through Worldprint Ltd.

09 10 11 12 13 10 9 8 7 6 5 4 3 2 1

FOR A CATALOG OF ALL BOOKS PUBLISHED BY OSPREY MILITARY AND AVIATION PLEASE CONTACT:

NORTH AMERICA
Osprey Direct, c/o Random House Distribution Center, 400 Hahn Road, Westminster, MD 21157, USA
E-mail: uscustomerservice@ospreypublishing.com

ALL OTHER REGIONS
Osprey Direct, The Book Service Ltd, Distribution Centre, Colchester Road, Frating Green, Colchester, Essex, CO7 7DW, UK
E-mail: customerservice@ospreypublishing.com

Osprey Publishing is supporting the Woodland Trust, the UK's leading woodland conservation charity, by funding the dedication of trees.

www.ospreypublishing.com

AUTHOR'S NOTE

The author would like to thank Wojciech Luczak, Richard Stickland, Dirk Caemerlynck, Michael Jerchel, Slava Shpakovskiy, Mikhail Baryatinskiy, and many friends in Russia for providing photos used in this book. A word of appreciation also goes to my colleagues at the Institute of Defense Analyses (IDA), David Markov and Andrew Hull, for their good humor to my constant badgering to visit yet another tank museum during our visits to Russia. A special note of thanks is extended to Nikolai Petrovich Parshukov and his staff at PTSK in Omsk for their Siberian hospitality during my visits to the VTTV exhibition in Siberia in 1997 and 1999. Thanks also go to the staffs of KBTM, KhKBM, LKZ, ZTM, NII Stali, and VNII Transmash who were kind enough to answer my many questions over the years.

EDITOR'S NOTE

For ease of comparison between types, imperial measurements are used almost exclusively throughout this book. The following data will help in converting the imperial measurements to metric:

1 mile = 1.6km
1lb = 0.45kg
1 yard = 0.9m
1ft = 0.3m
1in. = 2.54cm/25.4mm
1 gal = 4.5 liters
1 ton (US) = 0.9 tonnes

CONTENTS

INTRODUCTION 4

ORIGINS 4
- New Medium Tank for the 1980s
- The Turbine Option
- Obiekt 219

THE T-80B 12
- Reactive Armor: the T-80BV

SUPER-TOUGH: THE T-80U 19
- Back To The Diesel: the Kharkov T-80UD

T-80 AT THE CROSSROADS: THE SOVIET COLLAPSE 28

ACTIVE PROTECTION 35

THE UKRAINIAN T-84 38

T-80 FOLLOW-ON TANKS 43
- Specialized T-80 Derivatives

FURTHER READING 46

GLOSSARY 47

INDEX 48

T-80 STANDARD TANK
THE SOVIET ARMY'S LAST ARMORED CHAMPION

INTRODUCTION

The T-80 tank was meant to be the ultimate Soviet main battle tank (MBT), entering the Soviet arsenal around the same time as the new NATO-generation American M1 Abrams, British Challenger, and German Leopard 2. It was not a new design, but rather an evolutionary reconsideration of the T-64A tank. In the event, the T-80 proved to be deeply troubled, offering modest advances over the existing T-64A and T-72 tanks, yet being considerably more costly due to the use of a powerful but thirsty gas-turbine engine. After the fall of the Soviet Union in 1991, there was fierce competition between surviving tank plants to win the contracts for a standard tank for the new Russian Army, and the rival T-90 was selected as the next Russian tank. Curiously enough, the T-80 fared better in Ukraine, where a locally manufactured version called the T-84 entered production. There were attempts to push the T-80 in new directions, including the mysterious Molot program and the more recent Black Eagle, and improved versions of the T-80 are likely to form the armored backbone of the Russian and Ukrainian armies for decades to come.

ORIGINS

The first fundamentally new Soviet tank design to emerge in the Cold War years was the T-64, which was intended as a replacement for the T-54 design that originated in 1944–45. The T-64 set the pattern for Soviet tanks from the 1960s through the end of the century. It was the brainchild of Aleksandr Morozov, who led the design bureau at the Kharkov Malyshev heavy equipment plant. This bureau had been responsible for most Soviet medium tank design since the 1930s, including the T-34, T-44, and T-54 designs, and it began work on the new design in 1953.

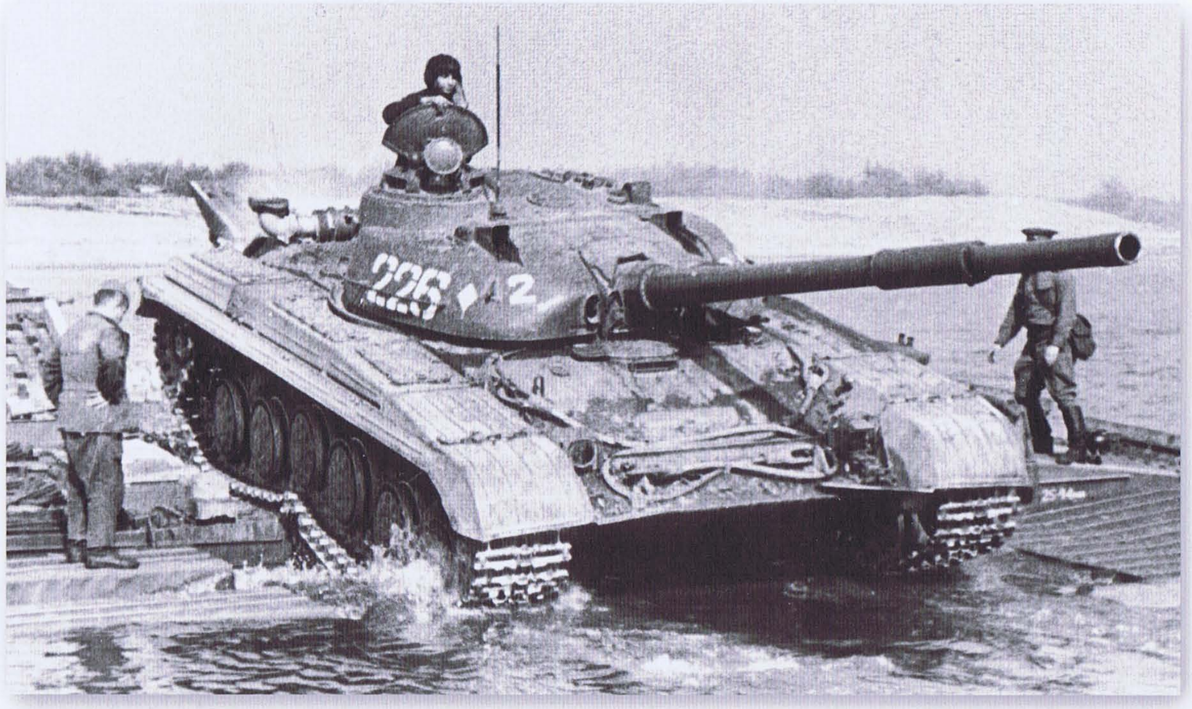
Codenamed "Obiekt 430," the tank was intended as a fundamentally new design, offering substantially more performance than the existing T-54 series in terms of firepower, armor, and mobility, yet remaining within similar weight and size limits. In order to accomplish this objective, the Obiekt 430 was powered by a completely new powerplant, the Charomskiy 5TD diesel, which used an opposed piston configuration to extract maximum power from a relatively small engine. The design also had substantially improved armor, including the first efforts to employ laminate armor. To keep the tank's size small, the crew was reduced to three, with the loader replaced by a mechanical auto-loader. The Obiekt 430 introduced a very lightweight steel road wheel with internal shock absorbers in place of traditional rubber rims.

A dramatic view of a T-80U racing down a hill during an exhibition at the Svetliy range near Omsk in 1997. (Author)

The first prototypes of the Obiekt 430 underwent testing in 1959, but the Soviet Army was a bit concerned that its 100mm D-54TS gun was not significantly more powerful than the D-10T gun in the T-54/T-55 or newer NATO weapons such as the British L7 105mm gun. The Obiekt 430 was modified as the Obiekt 432 to accept the new D-68 115mm weapon, and it went into production in October 1963 at Kharkov as the T-64 tank; about 1,190 were manufactured through 1969.

As the T-64 entered production, it was becoming apparent that NATO was moving in the direction of even more powerful tank weapons, such as the 120mm gun on the British Chieftain. This led to the development of a Soviet equivalent, the D-81T Rapira-3 125mm gun by F. F. Petrov's OKB-9 design bureau at the Motovilika Factory No. 172 in Perm, the primary Soviet artillery design center. This gun would be the main armament for Soviet tanks for the rest of the century. The Obiekt 434 with the 125mm gun was accepted for production in May 1968 as the T-64A tank.

The T-64A was a remarkable tank for its day, having a combat weight of only 37 metric tons while comparable in firepower and armor to NATO tanks such as the American M60A1, which weighed 47 metric tons. The lighter weight of the T-64A had been achieved by a ruthless trimming of size, so that the T-64A had substantially smaller internal volume than the M60A1: 11.5 versus 18.4 cubic meters. This space saving was especially evident in the



The Kharkov T-64 was the wellspring for Soviet tank development in the 1970s and 1980s. This is the original Obiekt 432 version, armed with the 115mm D-68 main gun.

engine compartment, where the T-64 had only 3.1 cubic meters of volume compared to 7.2 cubic meters in the American tank. The need to compress a powerful engine into this small space was a major design challenge, and one that was not altogether successful. The 5TD engine in the T-64A proved to be a nightmare in service use, with very low mean-time-between-failures – only 300 hours by 1970.

Although the Soviet Army had planned to end T-62 production at the massive Uralvagon plant in Nizhni-Tagil in favor of the T-64A, the design bureau there independently developed an alternative solution, which eventually emerged as the T-72. This was originally intended as a "mobilization" version of the T-64, meaning a cheaper expedient that could be put into mass production in the event of war. It retained the same basic hull and turret as the T-64A, but adopted a more conservative engine design, using a diesel evolved from that on the T-34, T-54, and T-62. The larger engine increased the engine compartment volume from 3.1 to 4.2 cubic meters, but added 80hp more output. When tested, it was found that the added dynamic load on the suspension led to premature failure, so a more conventional suspension was substituted. Series production of the T-72 Ural tank started at Nizhni-Tagil in 1974 instead of the T-64A.

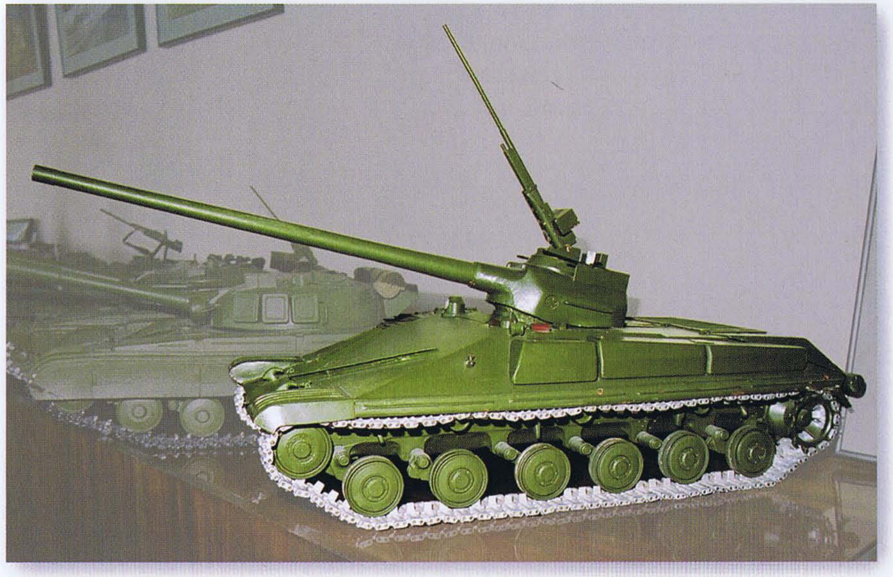
New Medium Tank for the 1980s

In 1971, the Soviet tank industry began work on a new tank design intended to replace the T-64 and T-72 series after 1981. The new designs were nicknamed "Perspektivy" from the title of the government edict *Rassmotrennie proektov perspektivnikh tankov 80-kh godov* (Examination of projects for prospective tanks for the 1980s) or NST (*Noviy sredniy tank*: New medium tank). The design bureau in Leningrad offered the turbine-powered Obiekt 225 and diesel-powered Obiekt 226; Chelyabinsk offered the Obiekt 780. Both were conventional turreted designs with new composite armor, and would be armed with the new D-85 gun being developed at Perm; it was still not settled whether this would be a 130mm smoothbore, 122mm rifled gun, or 125mm gun. Kharkov was relatively slow coming up with their alternative, finally offering the T-74 (Obiekt 450). The T-74 was the most radical of the three designs, placing the crew in the hull and mounting the gun overhead. Over the next few years, all three design bureaus refined their offerings, the Leningrad project evolving into the Obiekt 258, the Chelyabinsk into the Obiekt 785, and Kharkov adding the modified Obiekt 480 to the Obiekt 450. Of the three bureaus, only Kharkov remained enthusiastic about the program. Leningrad began shifting its attention to a turbine-powered derivative of the T-64, and Chelyabinsk gradually shifted away from the tank business due to changes in senior staff. In spite of industry enthusiasm for the T-74, the army was skeptical after the T-64 debacle, and Morozov was old and on the verge of retirement.

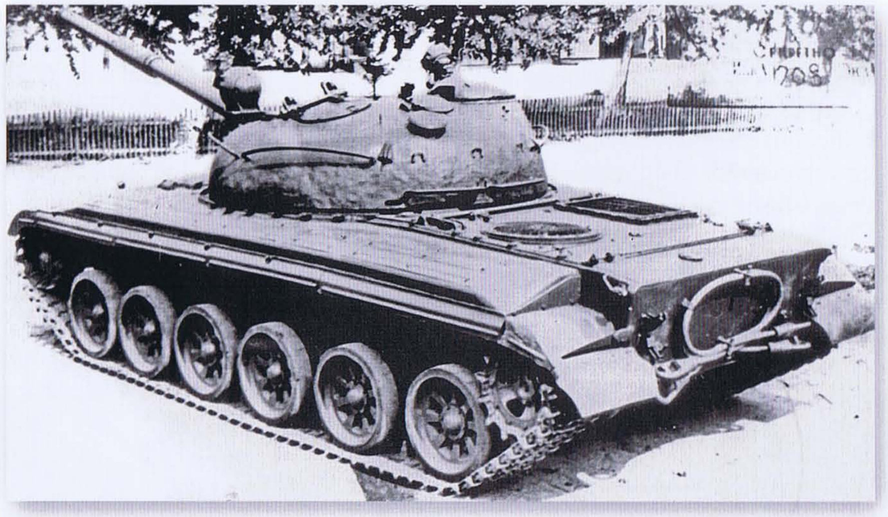
The Turbine Option

The idea of using gas-turbine engines to power tanks began to attract attention in the mid-1950s. Gas-turbine engines are essentially jet engines, but rather than relying on the jet exhaust for propulsion, the energy from the engine is converted into rotary motion via a transmission. The successful use of gas-turbines for helicopter propulsion sparked military interest in their potential application to tanks. The main attraction of gas-turbines was that they offered very high power output from a relatively small and lightweight engine.

Soviet investigation into gas-turbine powered tanks began in 1956, but several experimental efforts in the early 1960s led to widespread skepticism. While offering excellent road speeds, the gas-turbine had a ferocious appetite for fuel, averaging 240kg/hour compared to 83kg/hour for a comparable diesel. The other problem that became very apparent was that the ground environment of tanks is far less hospitable than the aerial environment of helicopters, and existing air filtration systems were completely inadequate to protect the gas-turbine engine. Gas-turbines draw in considerably more air during operation than conventional tank diesels, and ingestion of dust can lead to severe erosion of parts and other damage.



The T-74 (Obiekt 450) was Morozov's contender for the next-generation tank to replace the T-64. It used turret-less configuration with an externally mounted gun, as is seen in this model at the Kharkov Design Bureau.



A number of experimental turbine-powered tanks preceded the T-80, such as Uralvagon's Obiekt 166TM, powered by a GTD-3T helicopter engine.

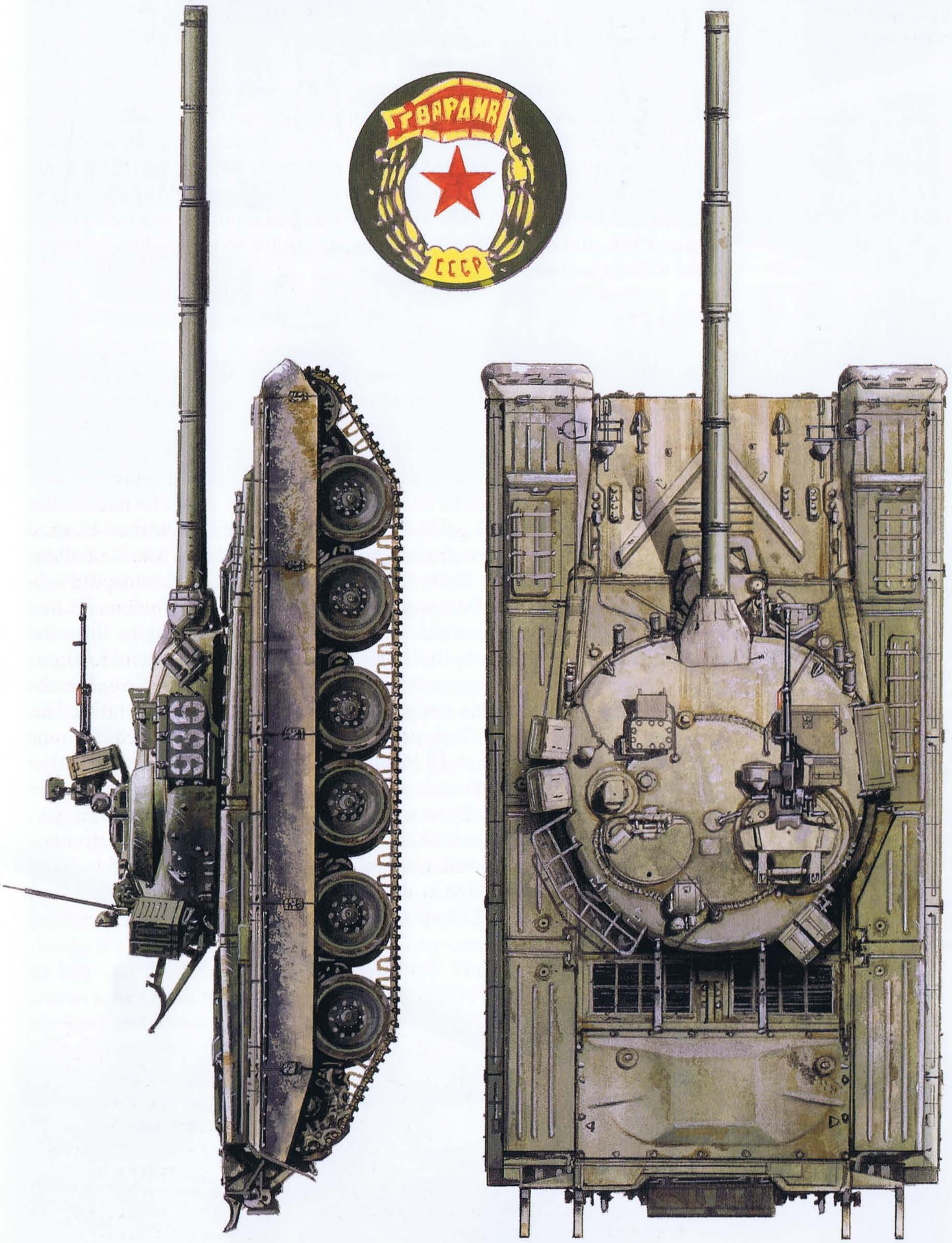
In 1960, Nikita Khrushchev ordered an end to heavy tank programs as "having no prospect" in an era of antitank missiles. As a result, many of the human and industrial resources at the Leningrad Kirov plant (Leningradskiy Kirovskiy Zavod: LKZ) in Leningrad and the Chelyabinsk tank plant became available, and these eventually formed the core of a Soviet gas-turbine tank program centered around Leningrad. General Zhozef Kotin, who had headed Soviet heavy tank design at Chelyabinsk during the war, was reassigned to head the All-Russia Scientific Research Institute of the Transport Industry (Vserossiyskiy Nauchno-Issledovatelskiy Institut Transportnogo mashinostroeniya: VNII Transmash), the tank industry's main research institute in Leningrad.

The LKZ plant, and its associated Design Bureau 3 (Konstruktorskoye Biuro-3: KB-3) headed by N. S. Popov, was ordered to prepare for production of the T-64 tank. As was the case with Uralvagon in Nizhni-Tagil, concerns over the reliability of the T-64A in service led to some reluctance to use the troubled 5TD engine, prompting interest in the potential of using a gas-turbine in any Leningrad T-64. A critical ingredient in the program was the 1967 assignment of S. P. Izotov's bureau at the Klimov Research-Production Association (Nauchno-proizvodstvennoe obedinenie: NPO) in Leningrad to develop a gas-turbine optimized for tank use. The revival of tank work in Leningrad after Khrushchev's ouster also

A **T-80B, LENINGRAD MILITARY DISTRICT, 1989**

Soviet armored fighting vehicles (AFVs) during the Cold War were painted in much the same color as the World War II 4BO dark green, but using improved paint. This color, officially called "camouflage green" (*zashchitniiy zeleno*), was an extremely dark green when new, and in the late 1980s and early 1990s was designated as KhS-5146; a US match is FS 34098. Tactical markings usually included a three-digit tactical number variously termed the combat number (*boevoy nomer*) or side tactical number (*bortovoy takticheskiy nomer*). The Soviet Army intentionally avoided a standardized system and encouraged variation between divisions for counter-intelligence reasons. Generally, the three numbers indicated battalion, company, and individual tank, but a common alternative was to use the first number to indicate the company within a regiment, and the next two numbers sequentially as the tanks within the company. The Soviet Army also periodically used geometric insignia to identify sub-units in a division, but this was not uniform. Tanks in divisions that were designated with the Guards honorific often carried the Guards emblem on the front of the Luna infrared searchlight, as was the case here.

A **T-80B, LENINGRAD MILITARY DISTRICT, 1989**

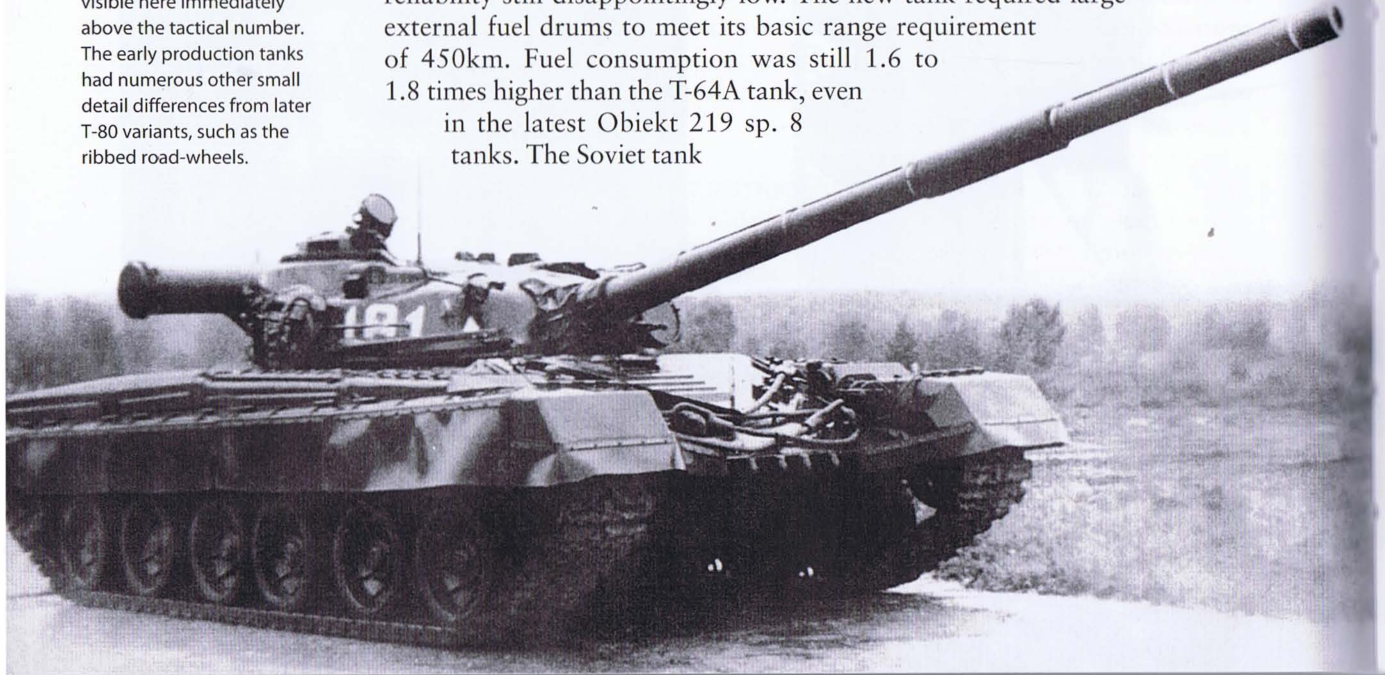


had a strong political support, as one of the most influential politicians in the new Brezhnev administration was the G. V. Romanov, who represented the Leningrad region in the Kremlin. The program formally began by a government decree on April 16, 1968.

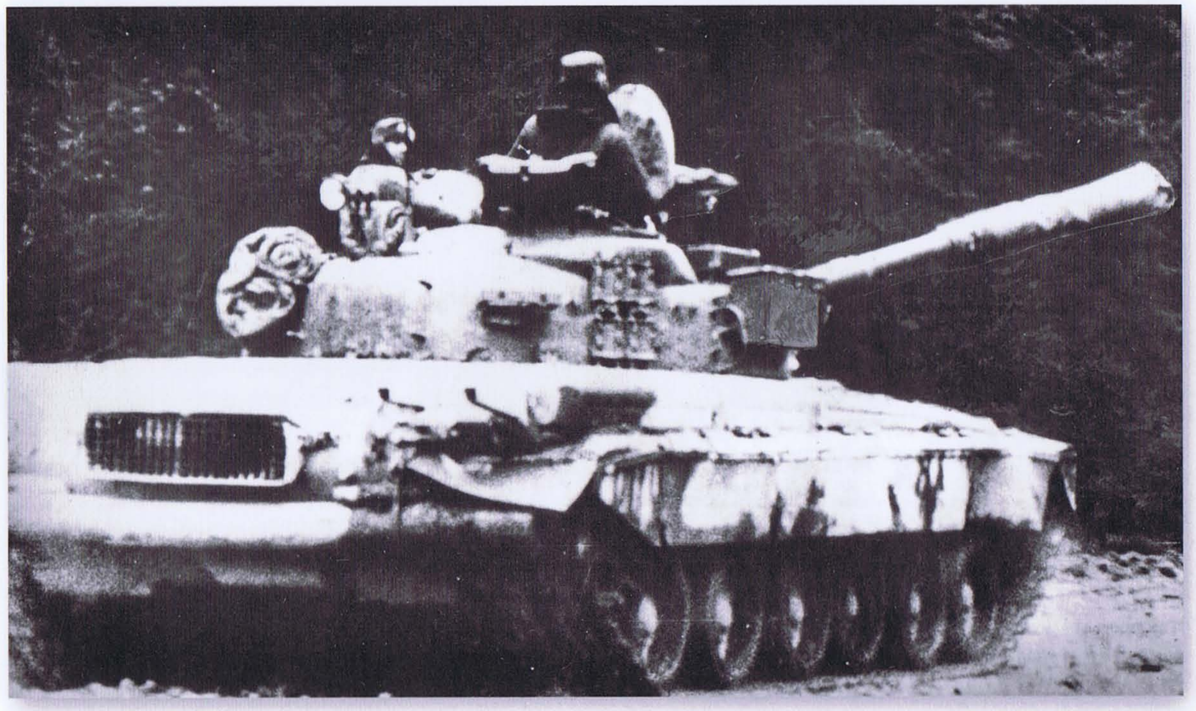
Izotov decided from the outset that a tank gas-turbine should be designed from the ground up and not simply base it on a helicopter engine as in the past, since a tank engine suffered from substantially higher shock loads in use due to rough ground and the jolt of gun detonations. In addition, the army wanted a "monoblock" engine, that is a powerplant which contained not only the engine, but the air filtration system, transmission, compressor, oil pumps, and other engine accessories that could removed from the tank as a single unit. The new GTD-1000T engine was first mounted in a tank chassis in May 1969, and industrialization of the design for series production began at the Kaluga engine plant in 1970.

Obiekt 219

The first experimental GTD-1000T turbine engines were placed on modified T-64 tank chassis known as Obiekt 219 sp. 1 (sp = *spetsifikatsiya*; specification), sometimes called the Groza (Thunderstorm). During the early trials, Izotov complained that the T-64 running gear would severely limit the speed potential of the gas-turbine engine due to the extreme vibration of the metal road wheels and metal track at high speed. This problem led to a new suspension for the Obiekt 219, but there was no effort to standardize this with the rival Nizhni-Tagil T-72 suspension. The first Obiekt 219 sp. 2 with the new suspension was completed in 1971. A large batch of about 60 pilot tanks were built in 1968–71 examining various suspension and sub-component combinations. Dust ingestion continued to be a problem, leading to the introduction of rubber side skirts and an improved engine filtration system. In general, the troop trials in 1973 showed the potential of gas-turbine engines in improving tank mobility compared to the T-64, but the engines failed to reach their design objective of 500 hours operating life. As late as 1972, only 19 of 27 engines manufactured reached even 300 hours. Battalion-sized troop trials in 1974 and 1975 in the Volga Military District simply confirmed that fuel consumption was very high and engine reliability still disappointingly low. The new tank required large external fuel drums to meet its basic range requirement of 450km. Fuel consumption was still 1.6 to 1.8 times higher than the T-64A tank, even in the latest Obiekt 219 sp. 8 tanks. The Soviet tank industry was behind in its production program, in part because of problems with the T-64A and T-72 programs, while at the same time trying to produce more T-55 and T-62 tanks for export after the shockingly high Egyptian and Syrian tank losses in the 1973 Yom Kippur war. In November 1975, the Minister of Defense, Marshal Andrei Grechko, rejected a plan to place the Obiekt 219 into production, citing the fact that it consumed twice as much fuel as the T-64A and offered no firepower or armor advance.

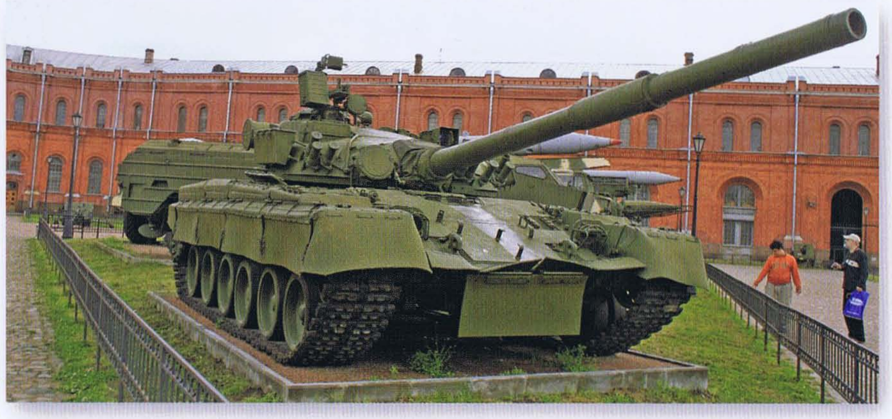


The initial T-80 tank production was quite small, probably about 130 tanks, due to the obsolescence of its turret, which was derived from the T-64A tank. It can be identified by the protrusion for the TPD-2-49 optical rangefinder on the right side of the turret, visible here immediately above the tactical number. The early production tanks had numerous other small detail differences from later T-80 variants, such as the ribbed road-wheels.

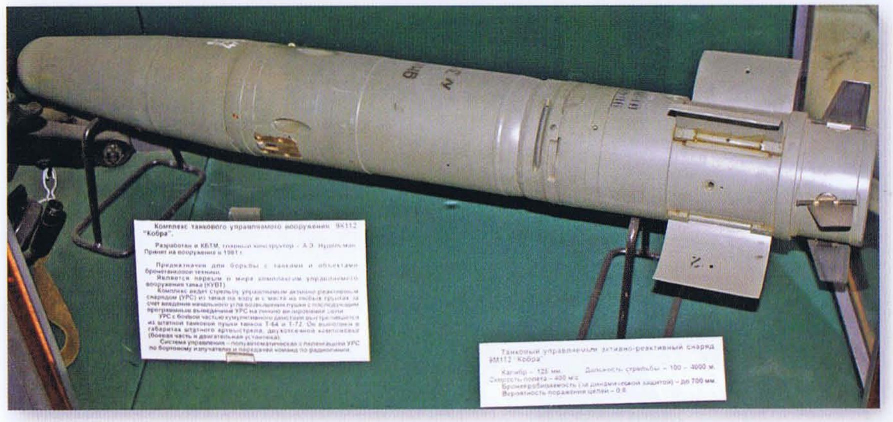


Mystery tank. This is the first widely distributed photo of a new tank that NATO called SMT 1983/1 (Soviet Medium Tank). This T-80B of the 40th Guards Tank Regiment, 11th Guards Tank Division, was taken by a member of the French Military Liaison Mission in Germany in December 1984 near the Königsbrück PMA (permanent restricted area). (US DoD)

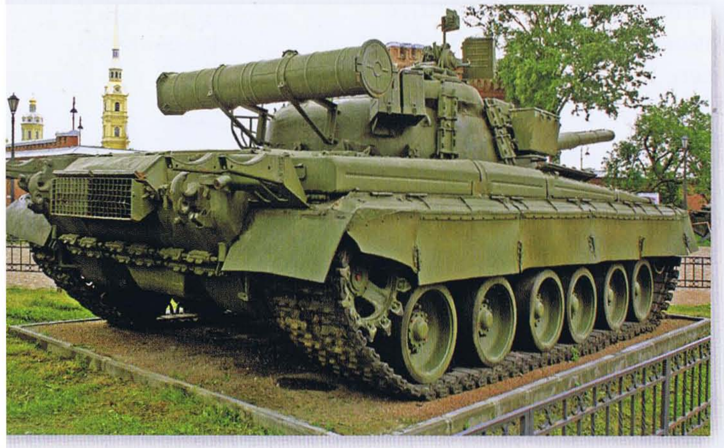
The Obiekt 219 might have been retired as another failed experiment but for Grechko's death in April 1976 and the appointment of Dmitriy Ustinov in his place. Ustinov was a break in Soviet tradition: not a field commander, but chief of the Soviet defense industries since World War II. He had been one of the most ardent advocates of the conversion to gas-turbine propulsion since the mid-1960s, and Obiekt 219 had been one of his pet projects. As a result, on August 6, 1976, the Obiekt 219 was suddenly accepted for production under the army designation of T-80. The numerous teething problems uncovered during recent trials were brushed aside, to be settled during the course of serial production. The plans called for T-80 production to begin at the LKZ instead of the T-64A. There had also been plans to convert the Omsk Factory No. 13 from the T-55 to the T-72, but these were changed and Omsk was also assigned to the T-80 program. Finally, Ustinov also planned eventually to shift the Kharkov plant from T-64 production to T-80 production at a later date. Ustinov was not enamored of the low-cost Nizhni-Tagil T-72 Ural tank, but recognized the need for an economical option to help replace older tanks such as the T-54, as well as to serve as a cheap mobilization configuration in the event of war. But Ustinov insisted that priority in innovations such as new fire-control systems were earmarked for the favored T-80, not the T-72. These production decisions in 1976, as well as the retirement of Aleksandr Morozov at Kharkov in May 1976, led to the abandonment of the T-74 NST program in favor of the T-80.



The T-80B was the first version of the T-80 built in significant numbers. The T-80B can be externally distinguished from the earlier T-80 by the rectangular GTN-12 antenna for the Kobra missile system in front of the commander's cupola, as seen on this example preserved at the Central Artillery and Engineer Museum in St Petersburg. (Author)



The 9M112M Kobra missile was the first widely deployed Soviet tube-fired guided missile. This shows the missile in its flight configuration with both halves clipped together. (Author)



BELOW

The T-80B was powered by the GTD-1000TF gas-turbine engine and the distinctive engine exhaust can be seen on the St Petersburg vehicle. The large tube on the rear of the turret is part of the Brod deep-wading system that permitted the tank to be driven underwater to cross rivers. (Author)

BELOW RIGHT

A T-80B on a flat-car during transit to the Group of Soviet Forces in Germany in 1989. The T-80B was popularly dubbed the "Mickey Mouse" tank by some NATO tankers, as the omnipresent rear fuel drums reminded them of the cartoon mouse. (US DoD)

In its original configuration, the long-delayed T-80 was essentially identical to the older T-64A in firepower, as it used exactly the same type of turret with an optical rangefinder. But it was hideously expensive: R480,000 versus R143,000 for the T-64A. In respect to its turret and fire controls, it was already behind the Kharkov T-64, which had evolved by 1976 into the T-64B with a new fire-control system incorporating a laser rangefinder and the capability to fire the Kobra tube-launched guided missile. As a result, production of the T-80 was very short-lived, running from only 1976 to 1978 at LKZ. Data released under the Conventional Forces in Europe (CFE) Treaty from November 1990, indicated that there were only 112 T-80s west of the Urals, which suggests that overall T-80 production was probably well under 200 tanks.

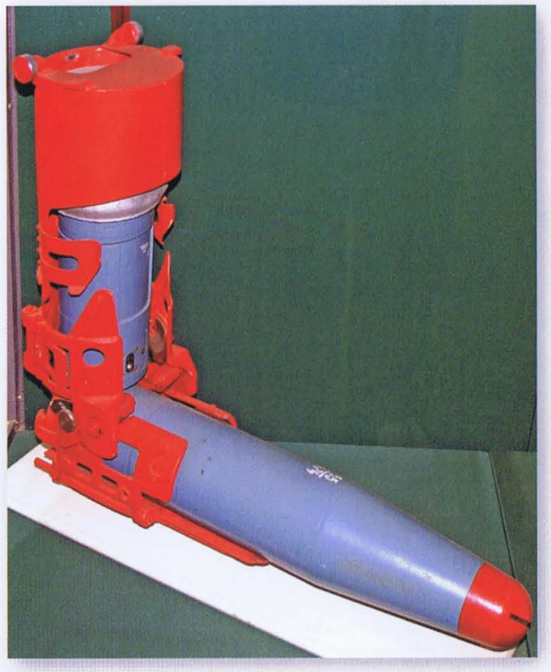
THE T-80B

Since Ustinov intended to replace Soviet tank production at all the plants but Uralvagon at Nizhni-Tagil with the T-80, it was imperative that its fire control be brought up to the standards of the T-64B. Due to rivalry between the various plants, Leningrad adapted the advanced features of T-64B to the T-80 design rather than simply using the Kharkov turret.

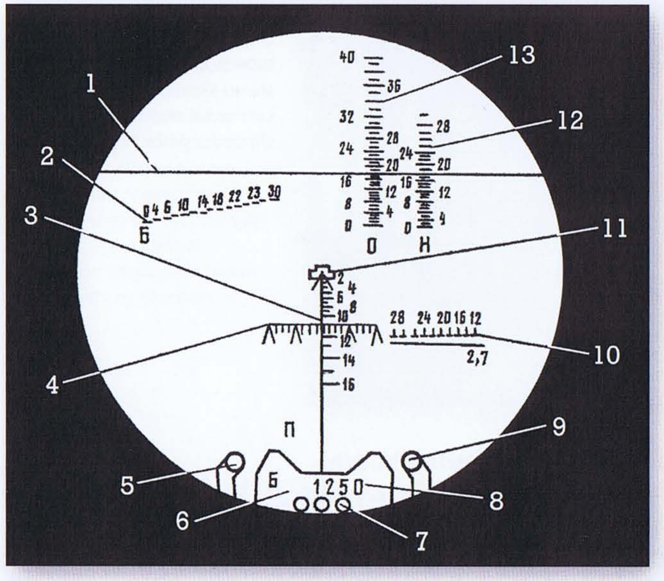
Kobra was the first tube-fired antitank guided missile in Soviet service. Development of these had started in 1960 due to Nikita Khrushchev's obsession with missiles and his conviction that missile-armed tanks were the way of the future. At first, these vehicles used conventional antitank missiles, but this practice was questioned by many designers as such vehicles could carry far fewer missiles than a tank's normal ammunition load. The first generation of gun-tube missiles did not prove to be acceptable and a second generation competition began on May 20, 1968 to extend the range of the new D-81 Rapira-3 125mm tank gun. The radio-guided Kobra was developed by A. E. Nudelman's KB Tochmash in Moscow, while the infrared-guided Gyurza was developed by S. P. Nepobidimy's Industry Design Bureau (Konstruktorskoye Biuro Mashinostroeniya: KBM) in Kolomna.

The Gyurza proved to be a more advanced design than available technology could support, so the program was cancelled in January 1971 and the effort focused on the Kobra. The first firing trials of the Kobra from modified T-64A tanks began in February 1971, and the 9K112 Kobra system was accepted for service on the new T-64B tank in 1976. The 9M112 missile was stowed in two parts in the tank's Korzhina ammunition carousel, with the front part holding the warhead and cruise motor, and the rear portion containing the flight controls and guidance section along with the 9D129 stub charge that ejected the missile out of the gun tube. As the 9M112 was loaded into the gun by the autoloader, both sections clipped together. The Kobra had a maximum range of 4km against tanks and about 5km against helicopters in a special launch mode. Missile guidance was via a two-channel radio command link with the GTN-12 command antenna in an armored box fitted on the right front corner of the turret roof. Due to the high cost of these missiles, tanks in combat would only be issued a few rounds, normally four rounds per tank in wartime. In 1975, each Kobra missile cost R5,000; to put this into some perspective, a typical tank diesel engine of the day was only about R9,000. In the 1990s, the Kobra system was upgraded with the improved 9M128 Agona missile, which had an improved warhead with armor penetration of 600–650mm.

The Obiekt 219R upgrade also involved the latest generation of Soviet laminate armor on the turret codenamed "Combination K," which incorporated a cavity in the cast steel armor of the turret front with



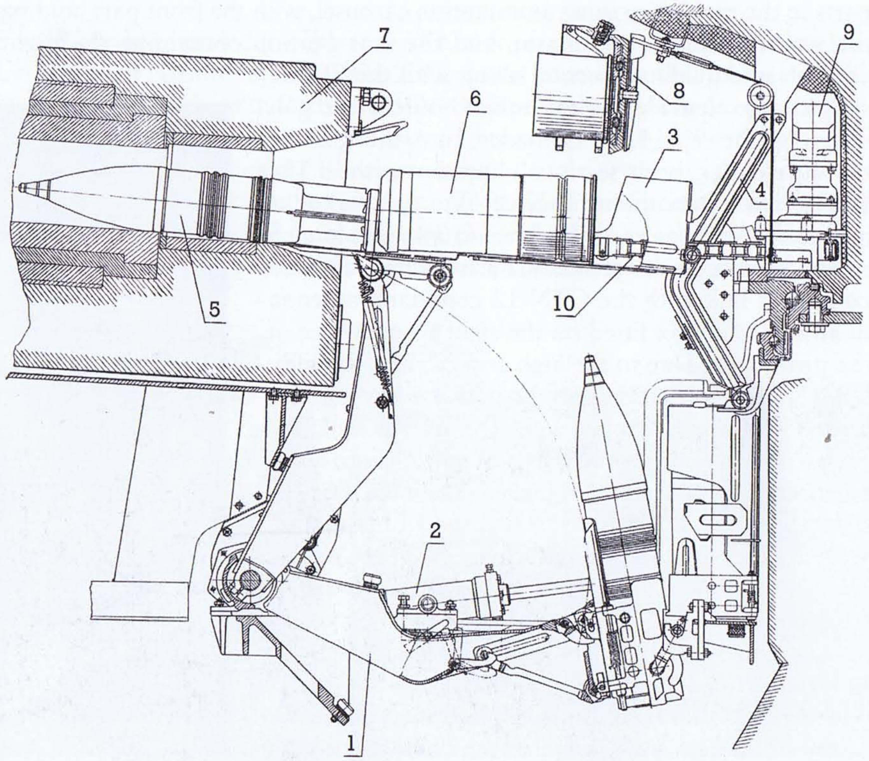
When loaded in the ammunition carousel of the T-80B tank, the Kobra missile was divided into two halves. The 9M43 forward section and 9B447 rear section which clipped together during the process of loading the missile into the 125mm gun. (Author)



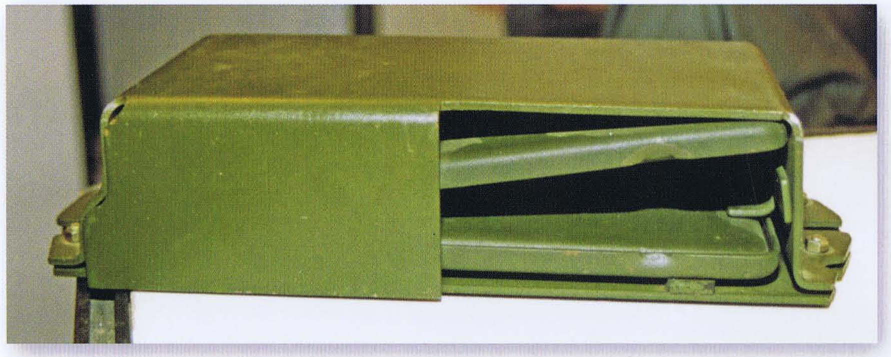
This is the view seen by the T-80B gunner through the 1G42 fire-control system reticle. 1) horizon line; 2) range-scale for the APFSDS projectile; 3) range-scale for the coaxial machine gun; 4) scale for the wind sensor; 5) projectile type; 6) gun readiness indicator; 7) target counter; 8) rangefinder reading; 9) commander's targeting indicator signal; 10) rangefinder scale; 11) central aim point in the vertical axis; 12) range-scale for the HEAT projectile; 13) range-scale for the HE-Fragmentation projectile.

ultra-porcelain (ultrafarforov) ceramic rods in a matrix. This type of laminate armor was the third evolution in laminate armor developed by the Steel Scientific Research Institute (Nauchno Ispytatielniy Institut Stali: NII Stali) research center, the earlier two in the T-64 having used aluminum in the cavity, and then ceramic balls in a metal matrix. Combination K offered protection equivalent to about 550mm of steel in the turret front. The glacis plate used a different type of laminate armor consisting of an outer layer of about 80mm of steel armor backed by 105mm of glass-reinforced plastic (*stekloplastika*) followed by a 20mm steel armor base offering protection equivalent to over 500mm of steel, including its steep slope. All of these composite armors were intended to provide better protection than a comparable weight of conventional steel armor against shaped-charge high-explosive antitank (HEAT) warheads, which at the time were the predominant NATO antitank munition both in the form of tank-fired HEAT projectiles as well as antitank missile warheads.

The Obiekt 219R was accepted for Soviet service in 1978 as the T-80B and entered production at LKZ that year, replacing the earlier T-80. It entered production at the Omsk plant in 1979, belatedly replacing the T-55A that was still in production there for export. The Omsk plant was also assigned to develop the Obiekt 630 command version of the T-80B, designated T-80BK. The command version added a land navigation system and an additional command radio.

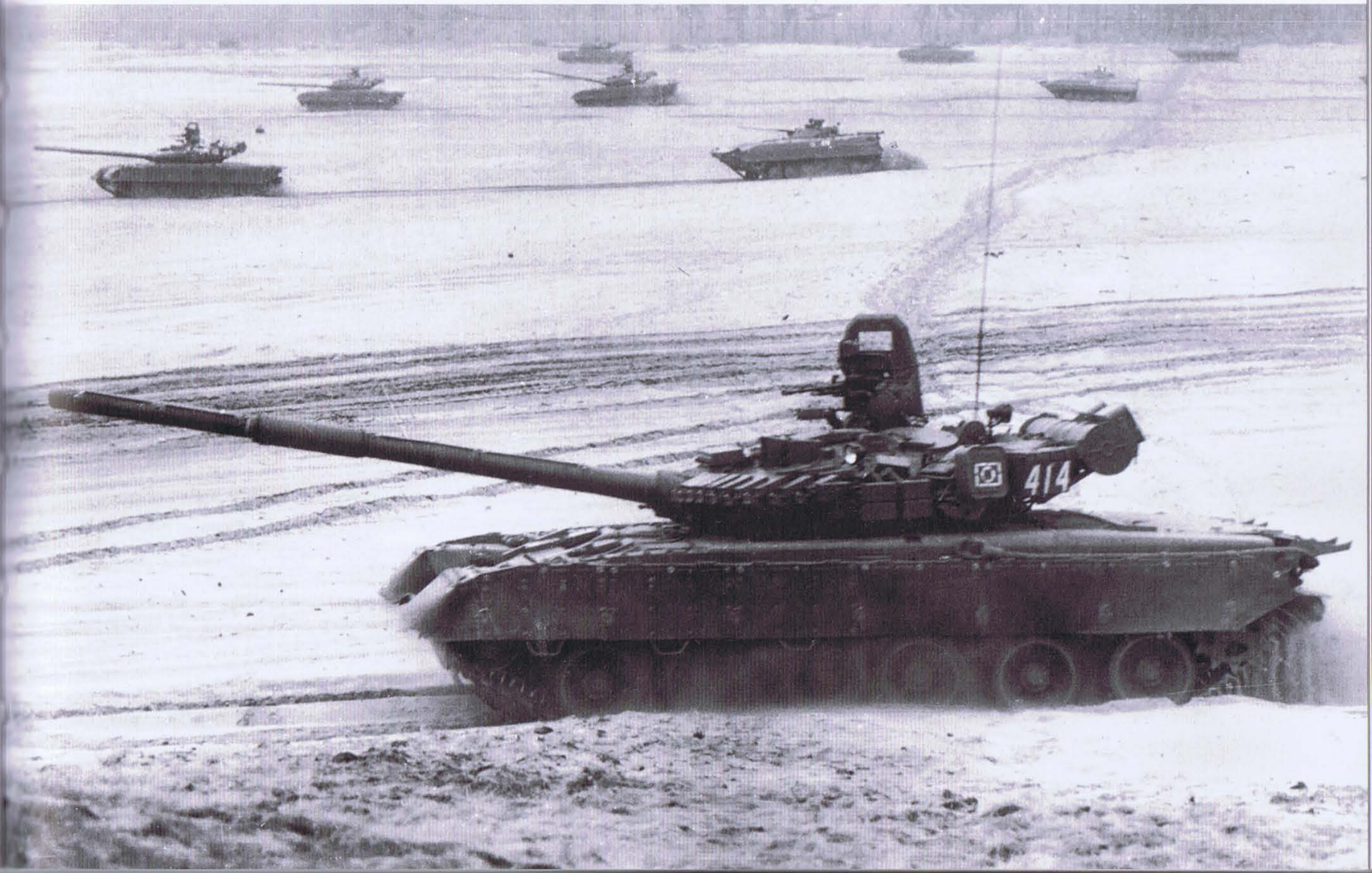


RIGHT
This illustration from the technical manual shows the Korzhina autoloading system in the T-80B. The propellant casing is stored vertically around the base of the turret while the projectile is horizontal, but in the illustration here the projectile is elevated in the process of being loaded. 1) loading arm; 2) hydraulic actuator; 3) rammer; 4) right side brace; 5) projectile; 6) propellant case; 7) gun breech; 8) spent case collector; 9) rammer drive.

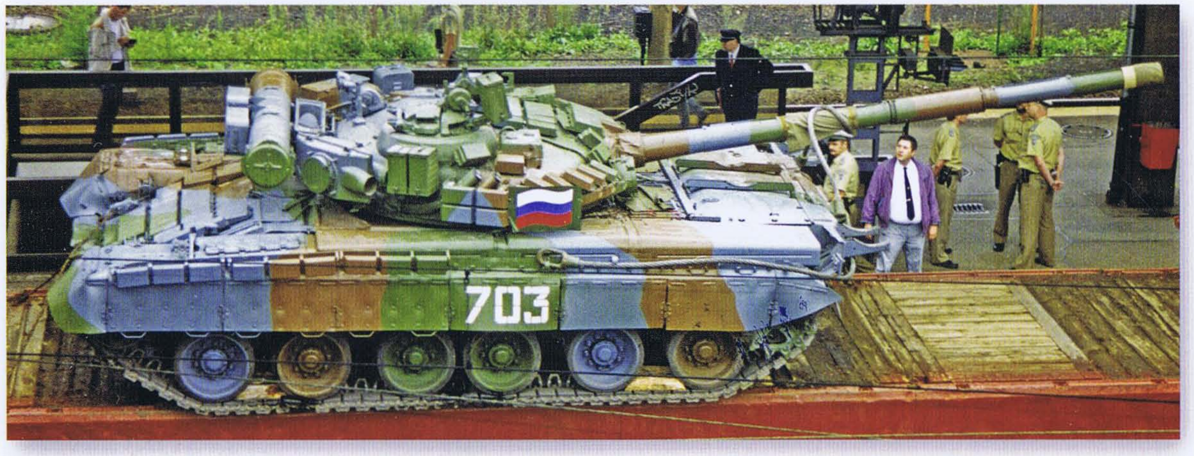


The Kontakt-1 explosive reactive armor box contained two 4S20 explosive panels, as shown in this cut-away. (Author)

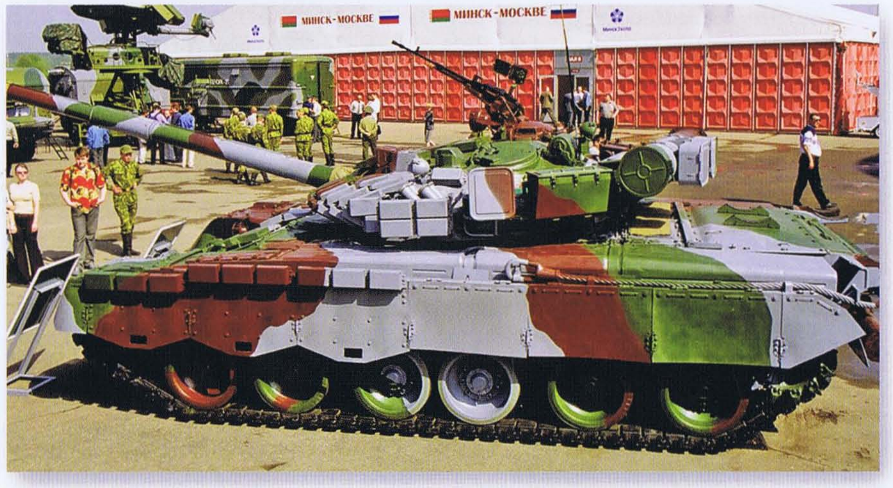
The T-80B became the most common production version of the T-80, and the first version to be forward deployed with the Group of Soviet Forces in Germany (GSFG) starting in 1981. The T-80B was first seen by NATO moving into Germany in April 1983 near Halle, beginning with the 29th Tank Regiment, 9th Tank Division of the 1st Guards Tank Army (GTA), and with units of the 8th GTA in 1984. By 1985, each division in the 1st GTA and 8th GTA had received some T-80B tanks. According to data released under the CFE Treaty, there were 3,518 T-80B and 217 T-80BK command tanks in service west of the Urals in November 1990, plus a further 617 upgraded T-80BV, for a grand-total of 4,352, amounting to 90 percent of overall T-80 strength. There were very few T-80 tanks stationed east of the Urals, except for those still in the Omsk plant and in a handful of depots and schools.



The T-80BV appeared in forward-deployed Soviet divisions in the second half of the 1980s, including two divisions in the Northern Group of Forces in Poland, the 6th Guards Vitebsk Motor Rifle Division in Pomerania, and the 20th Zvenigorod Tank Division in Silesia. This example is seen on maneuvers in Poland. Notice that in peacetime, the Kontakt-1 explosive reactive armor bricks are not fitted to the side skirts.



ABOVE
A colorfully camouflaged T-80BV of the Group of Soviet Forces in Germany on a flat-car at the Berlin-Lichtenberg rail station in September 1994 during the withdrawal of Soviet units from the former East Germany. (Michael Jerchel)



RIGHT
Belarus ended up with 92 T-80B after the Soviet collapse and this heavily camouflaged T-80BV was displayed at one of the Milex exhibitions. (W. Luczak)

Reactive Armor: The T-80BV

During the 1982 war in Lebanon, the Israelis used tanks fitted with explosive reactive armor (ERA) for the first time in history. This first generation of ERA was designed primarily to defeat HEAT shaped-charge warheads. Shaped-charge warheads differ from normal high-explosive warheads in that the explosive is shaped around a metal cone at the front of the warhead. When the warhead detonates, the explosive collapses the metal cone, forming it into

B

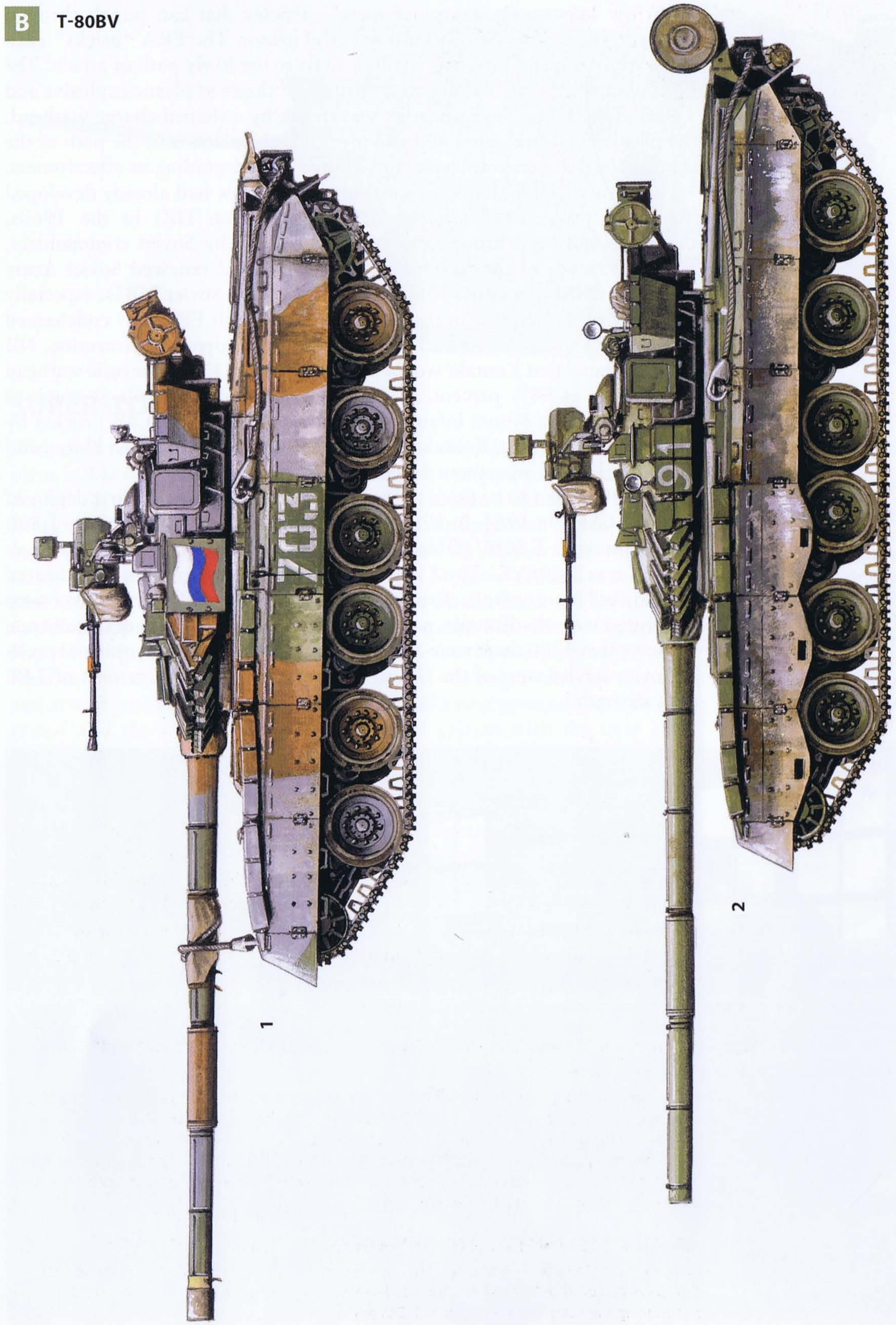
1: T-80BV, GROUP OF SOVIET FORCES IN GERMANY, BERLIN-LICHTENBERG BAHNHOF, JANUARY 1994

Disruptive camouflage painting of tanks became more popular in Soviet units in the late 1980s in response to similar developments in NATO. This particular scheme was more likely a presentation scheme applied to the tanks during their withdrawal from Germany back to Russia. The scheme is a three-color pattern of dark green, medium gray, and medium brown. A metal panel has been fixed over the side ERA bricks and a Russian flag painted on. The tank tactical number is carried on the side skirt instead of on the turret.

2: T-80BV, 81ST GUARDS MOTOR RIFLE REGIMENT, CHECHNYA, 1995

Many of the tanks sent to Chechnya were pulled out of depots and so carried no markings or disruptive camouflage beyond the usual dark-green finish. In this case, a two-digit tactical number has been applied over the side Kontakt-1 ERA bricks.

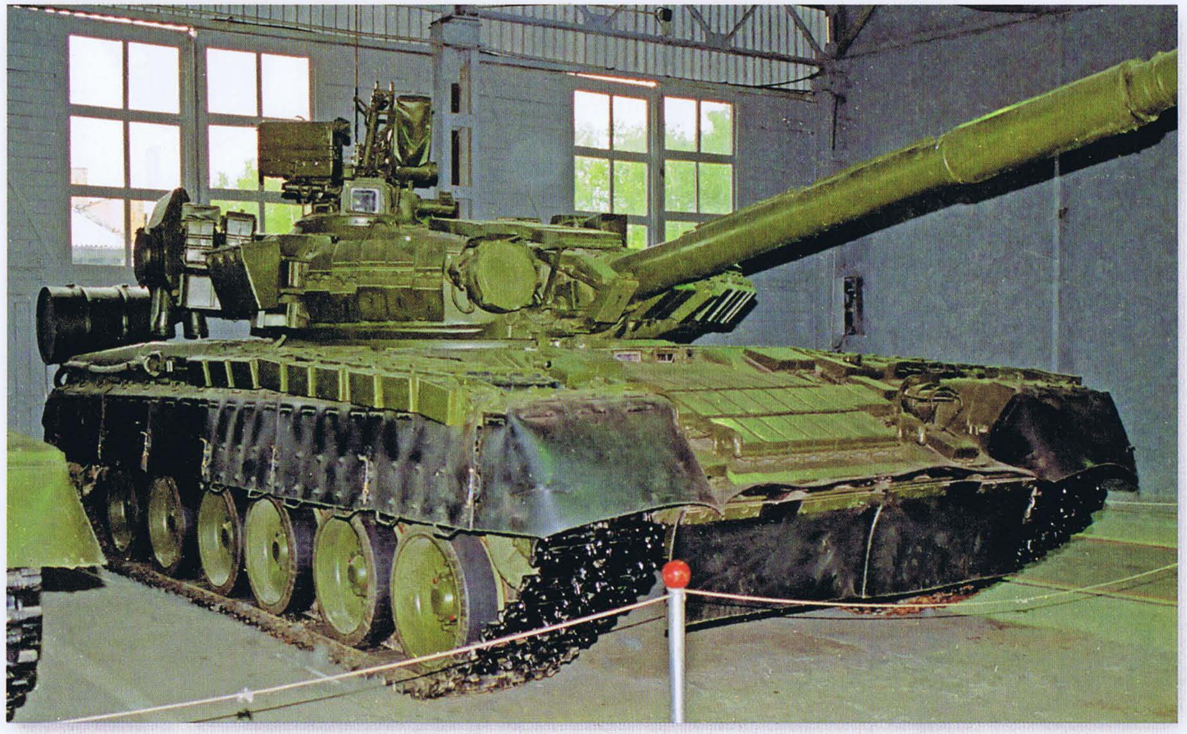
B T-80BV



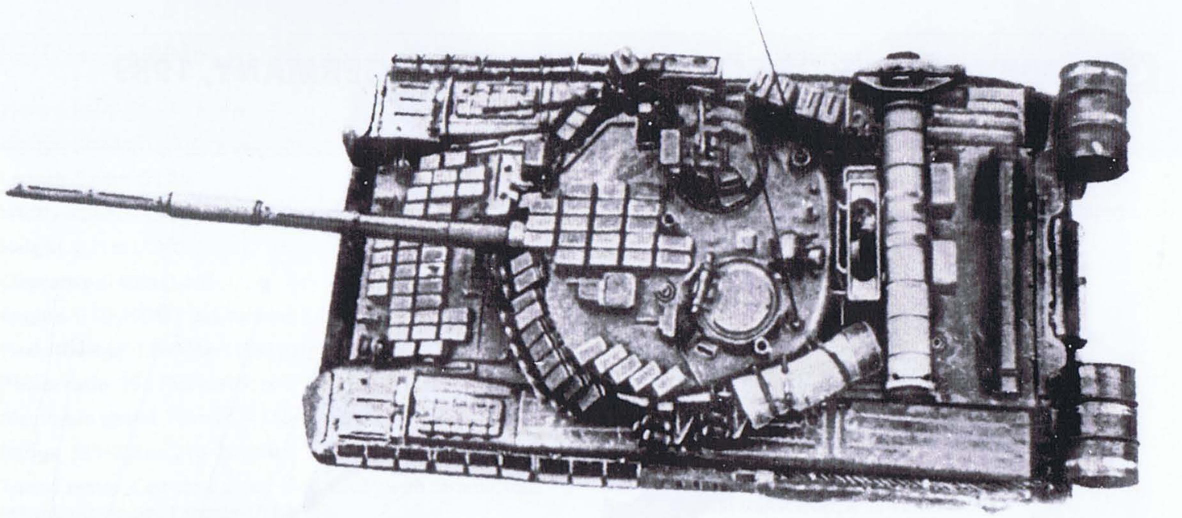
a narrow hypersonic stream of metal particles that can punch through substantial amounts of conventional steel armor. The ERA "bricks" each consisted of a metal box, at a shallow angle to the likely path of attack. The box contained dynamic elements consisting of sheets of plastic explosive and a steel plate. When the ERA brick was struck by a shaped-charge warhead, the plastic explosive detonated and propelled the plates into the path of the shaped-charge's penetrating stream, substantially degrading its effectiveness.

The Soviet NII Stali research institute in Moscow had already developed "dynamic protection" (*dinamicheskaya zashchita*: DZ) in the 1960s, but there had been little interest in deploying it by Soviet commanders. The appearance of the Israeli Blazer ERA in 1982 renewed Soviet Army interest and led to a crash program to deploy it on Soviet MBTs, especially those forward deployed in the GSFG. The NII Stali ERA was codenamed "Kontakt" and employed the first-generation 4S20 dynamic protection. NII Stali estimated that Kontakt would degrade a typical 125mm missile warhead by as much as 86% percent, a 125mm HEAT tank projectile as much as 58 percent, and a 93mm infantry Light Antitank Weapon (LAW) rocket by as much as 92 percent. Kontakt was somewhat lighter than Israeli Blazer, and NII Stali claims it was about 15 percent more effective.

Kontakt began to be fitted to Soviet tanks in 1983 and was first deployed with the GSFG in 1984. In 1985, the LKZ began to manufacture the T-80B with Kontakt as T-80BV (Obiekt 219RV); the corresponding command tank version was T-80BVK. The "V" suffix added to the designations indicated "explosive" (*vyzryvnoi*). During periodic rebuilding, older tanks were retrofitted with the Kontakt package. According to CFE Treaty documents, in November 1990 there were 594 T-80BV and 23 T-80BVK command tanks in Soviet service west of the Urals, amounting to about 13 percent of T-80 tank strength.



The Obiekt 219A mated the Kharkov Obiekt 476 turret to the T-80B hull. Some of the prototypes were fitted with the new Kontakt-1 reactive armor, but the type never went into full-scale production, awaiting the arrival of the more satisfactory second-generation Kontakt-5 reactive armor.



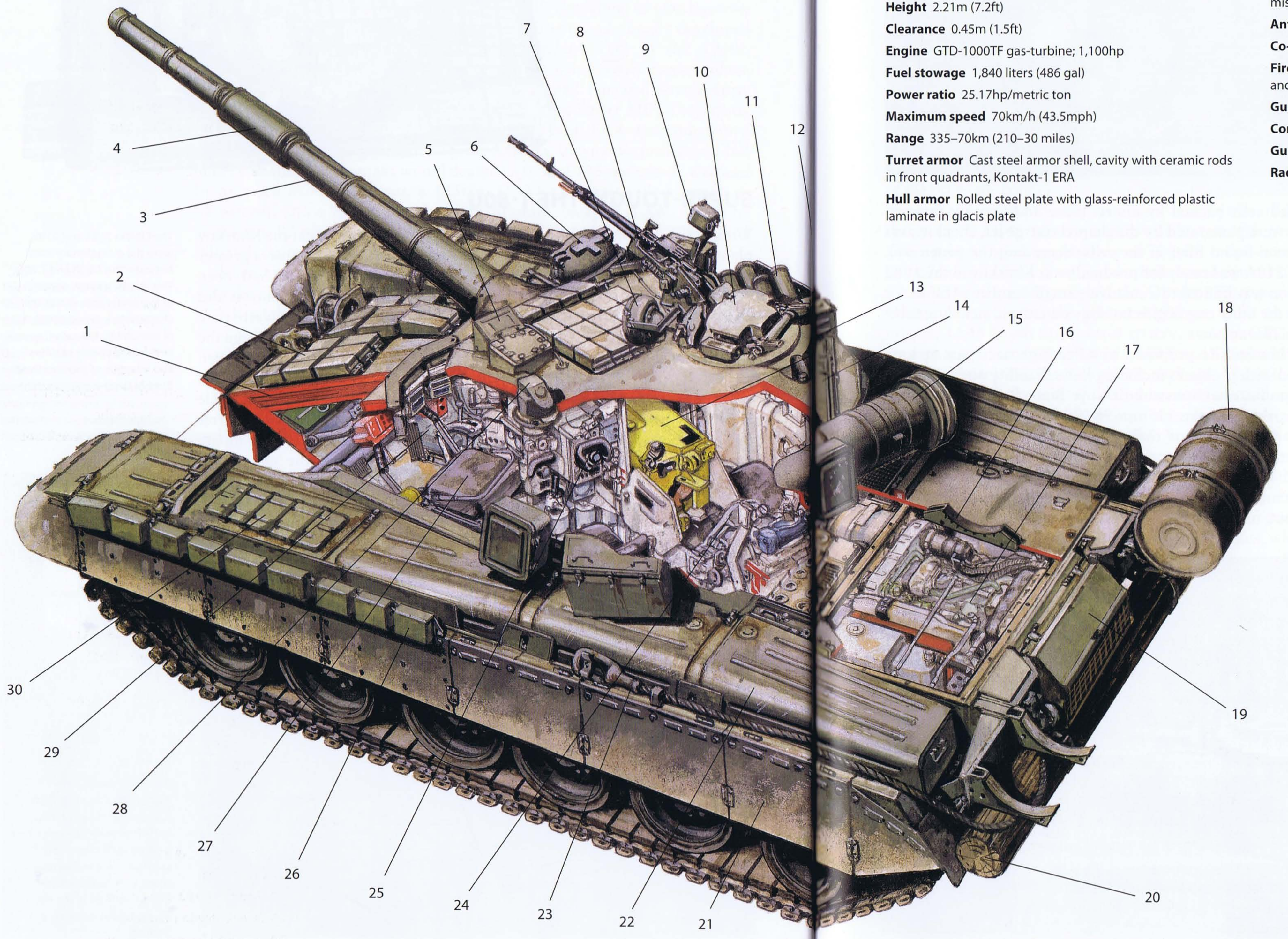
The Obiekt 219A and 219V were the evolutionary links between the T-80B and T-80U. This overhead view of one of the prototypes shows the characteristic broad turret rear of the Obiekt 476 turret, as well as the full panoply of tubes and adapters of the improved Brod-M deep-wading system.

SUPER-TOUGH: THE T-80U

With the retirement of Aleksandr Morozov, the chief designer at the Kharkov plant in May 1976, defense minister Ustinov attempted to impose a greater degree of standardization on Soviet tank designs. Kharkov had been developing an improved T-64B with substantially improved fire controls and new turret armor as the Obiekt 476 or Izdeliye 9A. Rather than waste time transferring the features to a new T-80 turret, Moscow decided to merge the new Kharkov turret with the T-80B hull as the Obiekt 219A Olkha, and then to shift Kharkov's production from the T-64B to the T-80. Under this scheme, Popov's design bureau at LKZ was responsible for the overall program while Kharkov's new chief designer, Nikolai Shomin, was responsible for the turret and armament. The Obiekt 476 turret included a new generation of laminate armor and the improved 1A45 fire-control system with the new 1G46 sight. At the time, two different types of advanced composite turret armor were being examined by NII Stali, and their reflecting-plate armor (*bronya s otrazhayushchimi listami*) was adopted on the new T-72B. The cavity in the front of the cast steel turret was filled with a laminate of alternating metal and non-metallic plates. The Obeikt 476 used a more expensive, semi-active filled-cell armor (*bronya s yachestim napolnitelem*) in the cavity consisting of two

The T-80U was built in relatively modest numbers as its move into production coincided with the Gorbachev defense reductions. This example is seen on display at one of its early public exhibits in front of the Nizhni-Novgorod fair-grounds in 1994. (Author)

C T-80BV, GROUP OF SOVIET OF FORCES IN GERMANY, 1989



TECHNICAL DATA

Type T-80BV (Obiekt 219RV)

Weight (loaded) 43.7 metric tons

Length 9.65m (31.7ft)

Width 3.58m (11.7ft)

Height 2.21m (7.2ft)

Clearance 0.45m (1.5ft)

Engine GTD-1000TF gas-turbine; 1,100hp

Fuel stowage 1,840 liters (486 gal)

Power ratio 25.17hp/metric ton

Maximum speed 70km/h (43.5mph)

Range 335–70km (210–30 miles)

Turret armor Cast steel armor shell, cavity with ceramic rods in front quadrants, Kontakt-1 ERA

Hull armor Rolled steel plate with glass-reinforced plastic laminate in glacis plate

Crew 3 (commander, gunner, driver)

Main gun 125mm 2A46M-1 Rapira-3 smoothbore, 6–8rpm

Ammunition stowage 38 main gun rounds

Missile capability 9K112-1 Kobra radio-guided, tube-fired missile with 9S461-1 fire control system

Anti-aircraft MG 12.7mm NSVT (300 rounds of ammo)

Co-axial MG 7.62mm PKT (1,250 round of ammo)

Fire-control system 1A33 with 1G42 sight/range-finder and 1V517 ballistic computer

Gunner's night sight TPN-3-49 image intensification

Commander's sight TKN-3V day/night sight

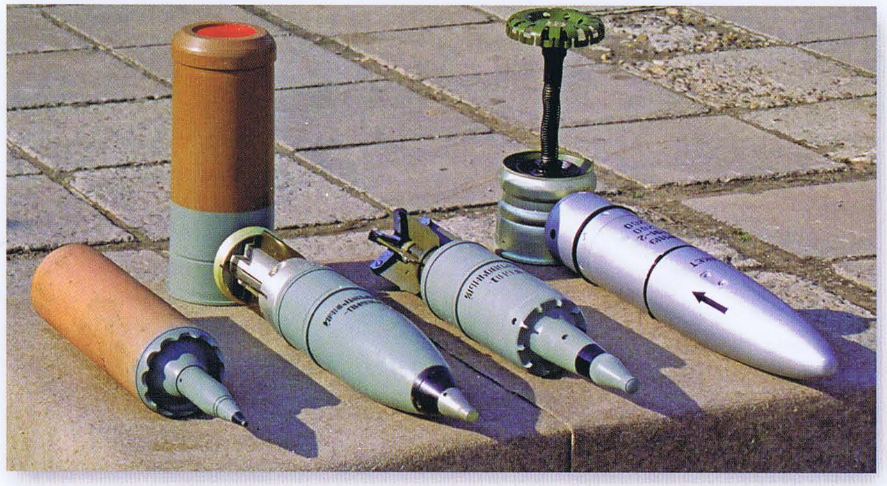
Gun stabilizer 2E26M

Radio R-123M transceiver; R-124 intercom

KEY

1 Lamniate glacis armor
2 Kontakt reactive armor box
3 125mm gun thermal sleeve
4 125mm gun bore evacuator
5 External port for the 1G42 fire control sights
6 L-4A Luna infrared searchlight
7 Commander's OU-3GKU infared searchlight
8 NSVT 12.7mm Utes machine gun
9 Machine gun sight container
10 Commander's hatch
11 Tucha 902B 81mm smoke grenade launchers
12 Machine gun ammunition boxes
13 Breech of 2A46M-1 125mm gun
14 Adapter for wading snorkel
15 OPVT wading snorkel tube
16 Rack for additional spare fuel drum
17 GTD-1000TF gas-turbine engine
18 External fuel drum
19 Exhaust grill for gas turbine engine
20 Unditching beam
21 Side skirts
22 Fuel cell
23 Tow cable
24 Main gun autoloader
25 Gunner's 1G42 fire control system
26 Kontakt reactive armor box
27 Driver's seat
28 Gunner's TPN-3-49 night sight
29 Driver's steering controls
30 Forward ZIP tool stowage bin

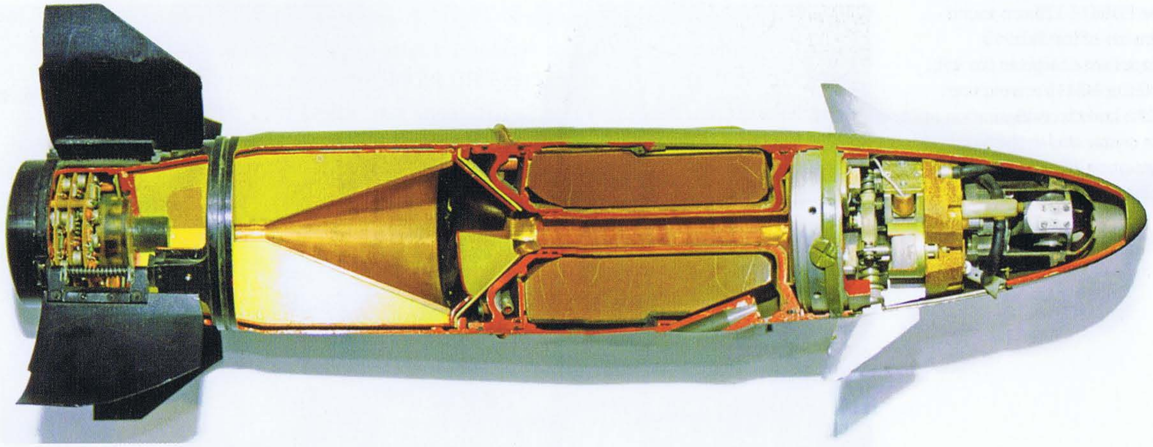
The T-80U has four principal types of 125mm combat rounds seen here left to right: APFSDS; HE-Fragmentation; HEAT; and the Refleks missile. The normal full-charge Zh52 propellant casing is seen in the back row to the left, while the 9Kh949 stub-charge for the Refleks missile is seen to the right.



rows of polymer-filled cells backed by a steel plate and another layer of resin. When the cells were penetrated by the shaped-charge jet, shock waves reverberated in the semi-liquid filler in the cells, degrading the penetrator. Although the Obiekt 219A was ready for production at Kharkov in the 1982 time-frame, production was limited to a relatively small number of tanks for trials purposes due to the other ongoing technology initiatives, including tube-fired missiles and reactive armor.

Although the Kobra missile promised to offer high accuracy at long ranges, it was plagued with problems including low reliability and high cost. The Instrument Design Bureau (Konstruktorskoye Biuro Priborostroyeniya: KBP) in Tula was working on the 125mm 9K120 Refleks guided weapon system which was an evolution of their 9K116 Baston/Sheksna guided projectile for 100mm and 115mm guns. In contrast to the radio-guided Kobra, Refleks used laser-beam riding guidance. The 9M119 missile is propelled out the gun tube by a conventional propellant charge. After launch, two sets of fins pop out, one for stability and the other for steering. The base of the projectile contains a circular optical port that receives the encoded laser signal from the 9S515 semi-automatic laser system that is contained within the gunner's 1G46 primary sight, which steers the projectile to the target. The warhead offers penetration of 700mm rolled homogenous steel armor compared to 600mm for the older Kobra and extended the ranges from 4 to 5km. While the integration of the Obiekt 476 turret on the Obiekt 219A Olkha was going on, the Obiekt 219V was built to integrate the Refleks missile, 1A45 Irtysh fire-control system, and the GTD-1000TF engine with supercharger. Some of the Obiekt 219A and Obiekt 219V test-beds received the first-generation Kontakt-1 DZ package. These test tanks have caused some confusion as many ended up in museums and are sometimes dubbed T-80A even though they never were accepted for service.

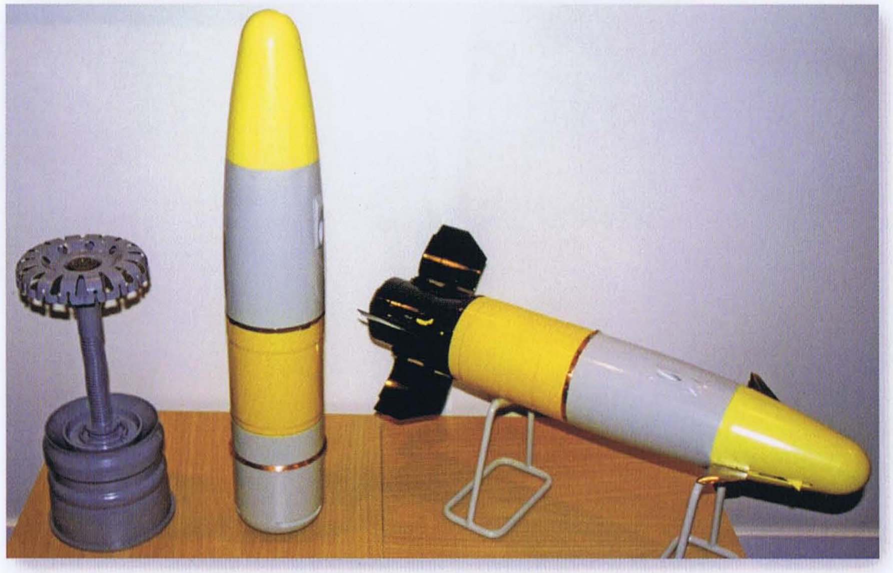
Jet-propelled! For all its problems, the gas-turbine engine on the T-80U gave it tremendous power and speed, and flying demonstrations like this one at the Staratel artillery proving ground near Yekaterinburg in 2000 became a common feature of Russian arms exhibitions. (Author)



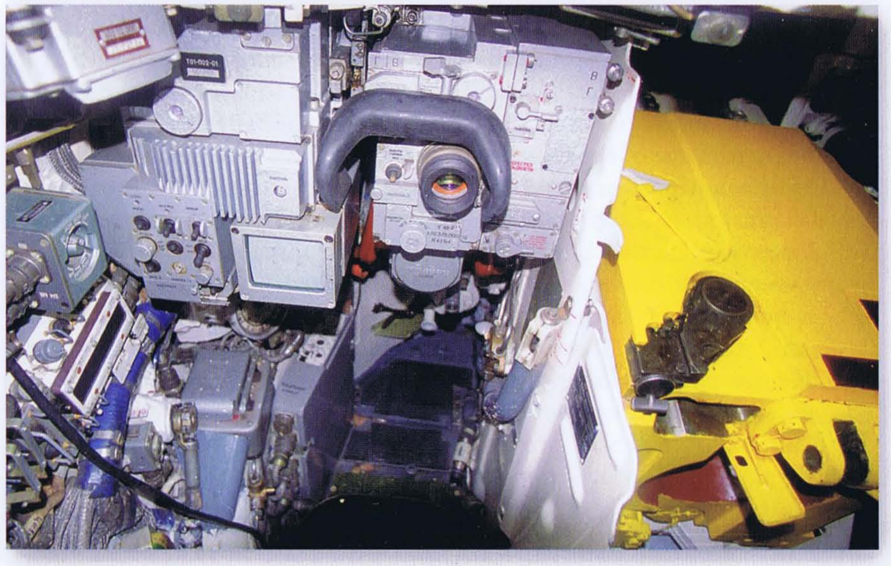
The 9M119 Refleks missile is seen here in cross-section. Behind the flight control section in the nose is the solid-rocket cruise motor, which vents through a pair of lateral ports behind the fins. The shaped-charge warhead is in the rear of the missile with the missile guidance section at the end. (Author)

As mentioned earlier, the Soviet Army pushed Kontakt-1 into service almost immediately. Kontakt was not entirely popular with the Soviet tank designers as it added 1.2 metric tons to the weight of the tank and was only able to protect against shaped charge warheads. By the mid-1980s, NATO was shifting its tactics towards the use of armor-piercing, fin-stabilized, discarding-sabot (APFSDS) projectiles for tank guns, which were not affected by Kontakt. The Soviet Army acquired some examples of Israeli M111 APFSDS 105mm ammunition from the Syrians that had been captured in the 1982 Lebanon war. Tests of this ammunition in the Soviet Union in 1982–83 indicated it could penetrate the existing glacis armor of tanks such as the T-72 and T-80. As a short-term fix, 20mm steel armor appliqué was applied to T-80B glacis plates. In addition, NII Stali accelerated research on a second-generation "universal" ERA called Kontakt-5, which was intended to have some capability to degrade APFSDS projectiles as well as shaped-charge warheads. Kontakt-5 relied on a much more substantial steel plate on the outside of the panel and this material was sufficient both to increase the degradation of shaped-charge jets, and also degrade APFSDS penetration by about 20–35 percent. This plate required a more energetic explosive insert, with a TNT equivalent of 0.28kg in the 4S20 panels of Kontakt-1 versus 0.33kg in the 4S22 panels of the Kontakt-5. The Kontakt-5 panels had to be properly angled for maximum effect and in combination with their size and weight, they could not be bolted on, as had been the case with Kontakt-1. Kontakt-5 had to be incorporated as a comprehensively designed armor package that would have to be undertaken during original manufacture or during capital rebuilding. As a result, Kontakt-1 and Kontakt-5 were

The 3UBK14 125mm round consists of the 9Kh949 propellant charge to the left, and the 9M119 missile seen in the launch configuration in the center and in the flight configuration with the fins unfolded to the right.



The interior of the T-80U is quite cramped compared to NATO tanks. This is the gunner's station on the left side of the turret, with the massive gun breech to the right and the main 1G46-2 fire-control system in the center.



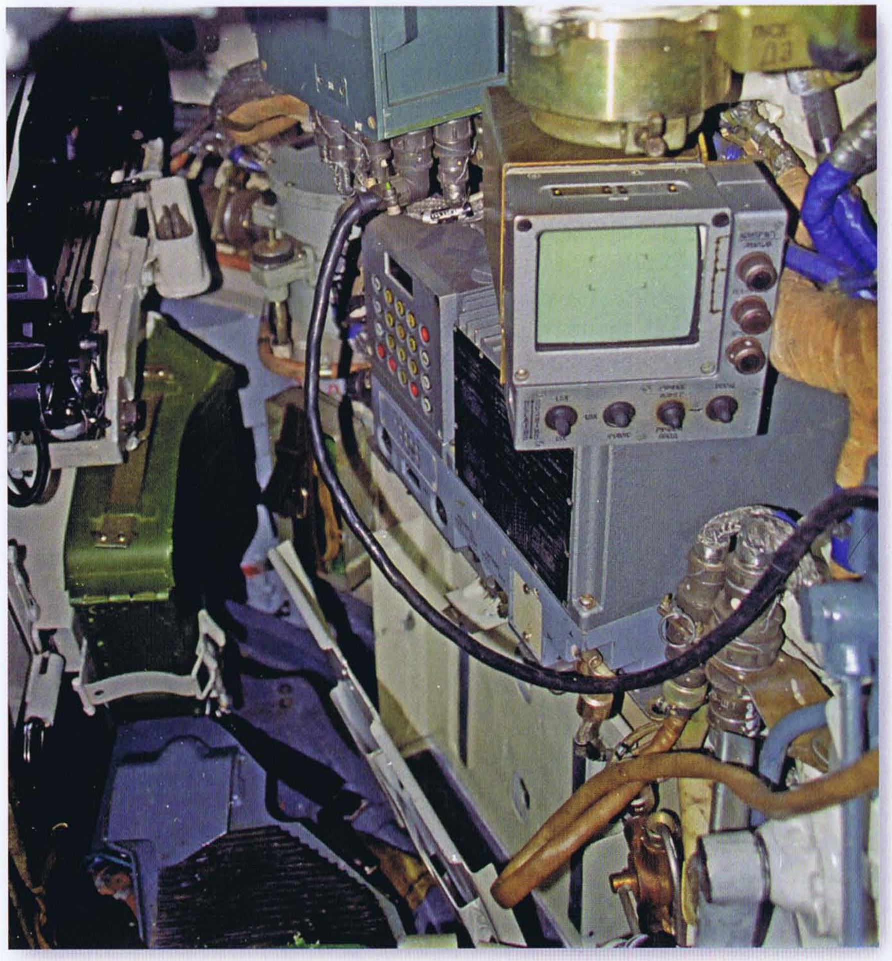
distinguished from one another as appliqué ERA (*navesnoy* DZ) versus integrated ERA (*vstroenniy* DZ).

The new Obiekt 219AS merged the features of Obiekt 219A and Obiekt 219V along with the Kontakt-5 protective package. A pre-production batch of 20 Obiekt 219AS was completed in late 1983, with eight immediately sent for troop trials and the remainder for state trials and factory testing. The Obiekt 219AS was accepted for Soviet Army service in 1985 as the T-80U (U = *usovershenstvovanniy*: improved) and went into series production at Omsk in 1987. According to documents released under the CFE Treaty, there were 410 T-80U tanks in operational service west of the Urals in November 1990, or about 8 percent of T-80 strength; this figure presumably included some of the later T-80UD (see below). Russian sources claim that Kontakt-5 and the new turret armor provided an unprecedented amount of protection for the T-80U, equivalent to 780mm against APFSDS and 1,320mm against HEAT in the turret front. Although the T-80U was undoubtedly the best Soviet tank of its day, it came at a high price. A VNII Transmash study concluded that the T-80U was about 10 percent more combat effective than the T-72B, but cost nearly three times as much: R824,000 compared to only R280,000.

Soviet tanks received a bad reputation after the poor performance of cheap export models of the T-72 in the hands of the Iraqi Army in the 1991 Gulf War. However, the T-80U and T-72B represented a fundamentally different capability, having substantially better armor and better ammunition. US Army live-fire tests against ex-Soviet tanks obtained in the 1990s concluded that NATO would have had a very hard time penetrating the advanced armor arrays deployed on the T-80U and T-72B; likewise their ammunition was substantially more potent than the export rounds exported to Iraq.

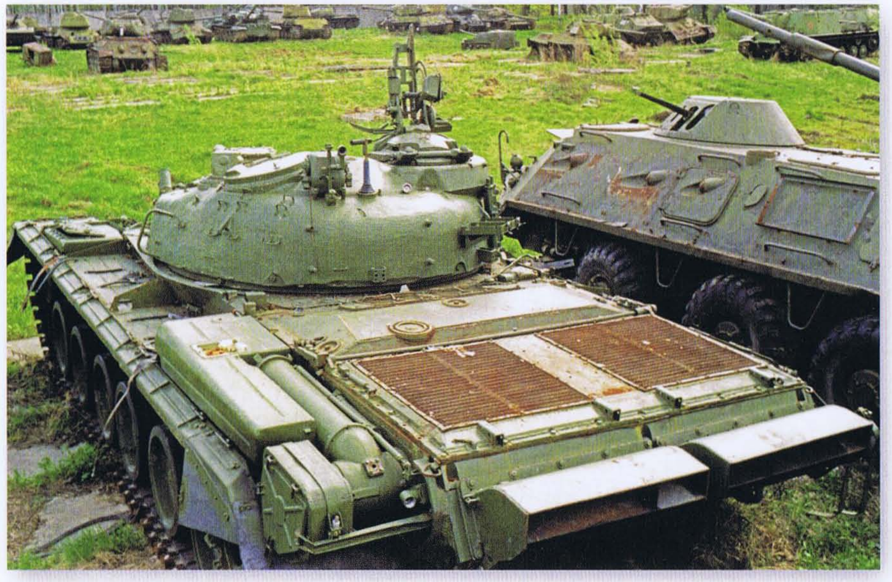
Back To The Diesel: the Kharkov T-80UD

The shortcomings of the turbine engine in the T-80 led to a continuing string of experimental alternatives using diesel propulsion. An initial diesel-powered version was developed by LKZ beginning in 1975–76, powered by the 2V16 (A-53-2) 1,000hp diesel designed by the Transdizel Special Design Bureau at the Chelyabinsk Motor Plant. This was mounted on a modified T-80B chassis as the Obiekt 219RD, but was not ready until 1983. Another diesel test-bed was developed at Omsk as the Obiekt 644, using the V-46-6 of the T-72 tank. Neither of these reached the production stage due to Ustinov's



The commander's station in the T-80U includes the 7.62mm PKT co-axial machine gun. The small monitor to the right is for the Agava thermal-imaging night sight. (Author)

The Obiekt 219RD was the first attempt to develop a diesel alternative to the T-80's turbine, using a Chelyabinsk Transdizel 2V16. The program had little support in Leningrad and never progressed beyond this prototype.



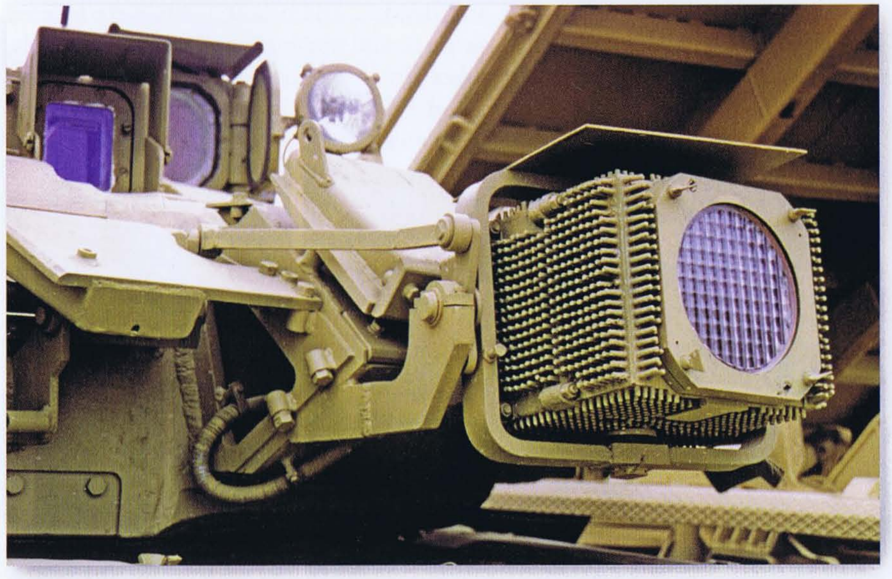
"turbinization" program. Nevertheless, there was continuing interest in the Soviet Army to replace the turbine on the T-80 due to its high procurement and operating costs. For example, in the 1980s the V-46 diesel engine on the T-72 cost only R9,600 while the GTD-1000 turbine was more than ten times more expensive at R104,000. Furthermore, the turbine had a shorter running life, consumed more fuel, and was complicated and expensive to maintain and repair.

Even if Ustinov insisted that Kharkov shift from T-64 to T-80 production, the Kharkov plant wanted to build their T-80s with a diesel. So the Obiekt 478, a third effort to develop a diesel-powered T-80, started in 1976 at Kharkov. It used the new 6TD 1,000 hp diesel developed at Kharkov for the improved T-64 (Obiekt 476) and the next-generation T-74. Another option was also explored, the Obiekt 478M, which was a much more elaborate configuration with the new Sistema fire-control system, Shater active protection system, and a Chelyabinsk Transdizel X-layout 1,500hp 124Ch diesel. The Obiekt 478M was recognized as being a case of the "best being the enemy of the good" – it was simply too expensive and complicated. The Obiekt 478, on the other hand, was falling behind the contemporary Obiekt 476 upgrade in terms of fire controls and armament features; for example, it relied on the older Kobra missile instead of the newer Refleks being considered for Obiekt 476. Nevertheless, Ustinov was still insistent on the "turbinization" of the army, and so production of the T-64B at Kharkov ended and the facility began to re-tool to manufacture the T-80U.

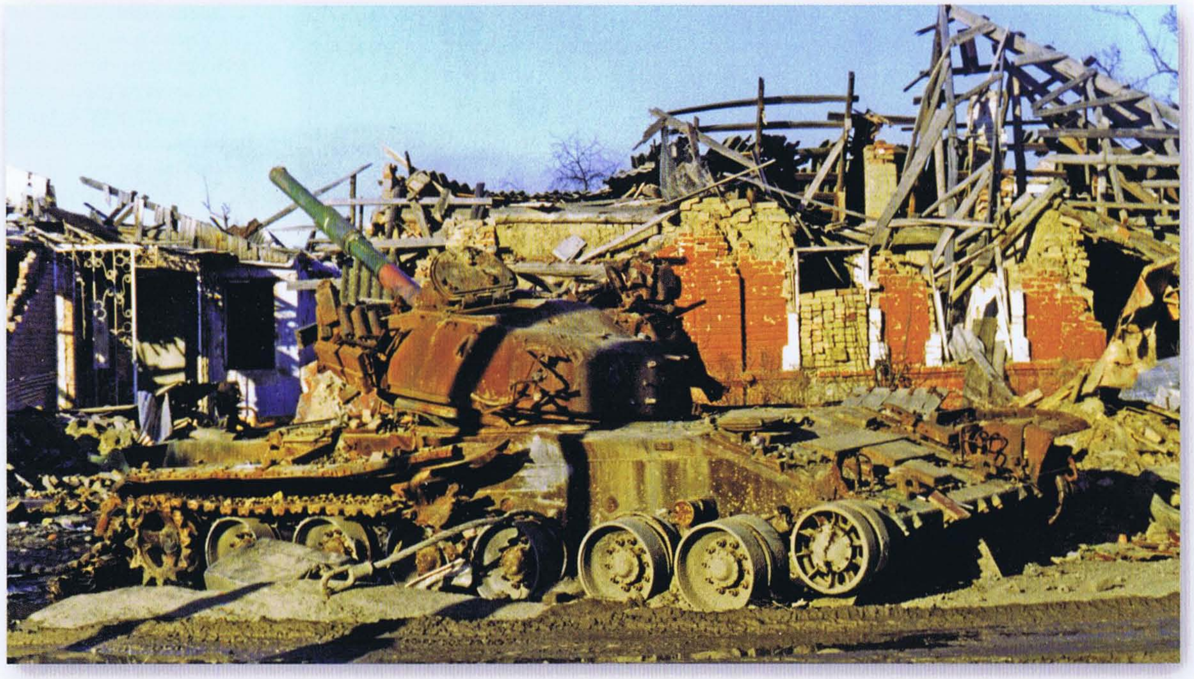
Ustinov's views were not universally shared within the Soviet Army and a Defense Ministry study in 1984 concluded that for the next five-year plan, the Soviet Army could purchase 2,500 tanks and 6,000 6TD diesel engines, or 1,500 tanks and 2,000 GTD-1250 turbine engines. Ustinov's death in December 1984, followed by that of Leningrad party-boss Romanov in July 1985, removed the two most prominent supporters of the Leningrad turbine tank and cleared the way for a return to diesel tanks. Production of the T-80U at Kharkov had been painfully slow anyway, and in the event only 45 were built there. Government approval for a diesel powered T-80U was speedily granted on September 2, 1985.

The Obiekt 478 diesel program was restarted as Obiekt 478B Bereza (Birch tree) with the 6TD engine in the T-80U. A total of five prototypes were quickly completed by year's end for trials purposes, but a parallel set of prototypes based on the less elaborate Obiekt 219A with the diesel were also built for comparison. Due to the earlier studies, test and evaluation work was very quickly completed and as a result, Obiekt 478B Bereza was demonstrated at the Kharkov tank school to Mikhail Gorbachev and other senior government and army officials. Government approval for production was quickly granted in 1986 but the production program was far from trouble-free, and the Soviet Army demanded improvements before large-scale production began. The original plan had been to designate the diesel-powered T-80U as the T-84, following the Kharkov tradition of the T-34, T-44, T-54, T-64 and T-74. This proposal led to a bitter "fight under the carpet" between the industry and army, with some detractors noting that the T-84 designation would draw attention to the fact that the Soviet Army was operating four different "standard" tanks – T-64, T-72, T-80, and T-84 – all with essentially the same characteristics except for four different powerplants. The issue was so contentious that it went to the top – Gorbachev's Central Committee of the Communist Party – for a final decision. In the end, the less conspicuous designation T-80UD was selected, indicating "Improved Diesel" (*Usovershenstvovanniy Dieselniy*). Soviet tank production continued to decline in the late 1980s due to Gorbachev's attempts to rein in defense spending. The original 1989 plan had been for 3,739 T-80 and T-72 tanks, but this was cut back to 1,530 tanks, and the 1990 plan cut to 1,445 tanks.

Total production of the T-80UD prior to the Soviet collapse was rather modest at about 500 tanks, of which about 350 were still located at the Kharkov plant when the Soviet Union collapsed in 1991. The T-80UD was first deployed with the two "Kremlin court divisions": the 4th Guards Kantemirovskaya Tank Division (4th GTD) and the 2nd Guards Taman Motor Rifle Division (MRD) in the Moscow area. The T-80UD was first publicly shown at the May 9, 1990 Victory Day parade in Red Square in Moscow. They were seen on the Moscow streets again during the attempted putsch in August 1991.



The Shtora system includes two TShU-1-17 optical jammers that emit a modulated infra-red signal that confuses the missile tracker used with typical NATO wire-guided missiles such as the TOW, Milan, and HOT. The full Shtora system also includes a laser warning system to help trigger smoke mortars to shield the tank from attack. (Author)



The T-80BV became a scapegoat for Russian failures during the attack on Grozniy in Chechnya in December 1994. The ammunition carousel proved especially worrisome, leading to catastrophic ammunition fires when hit.

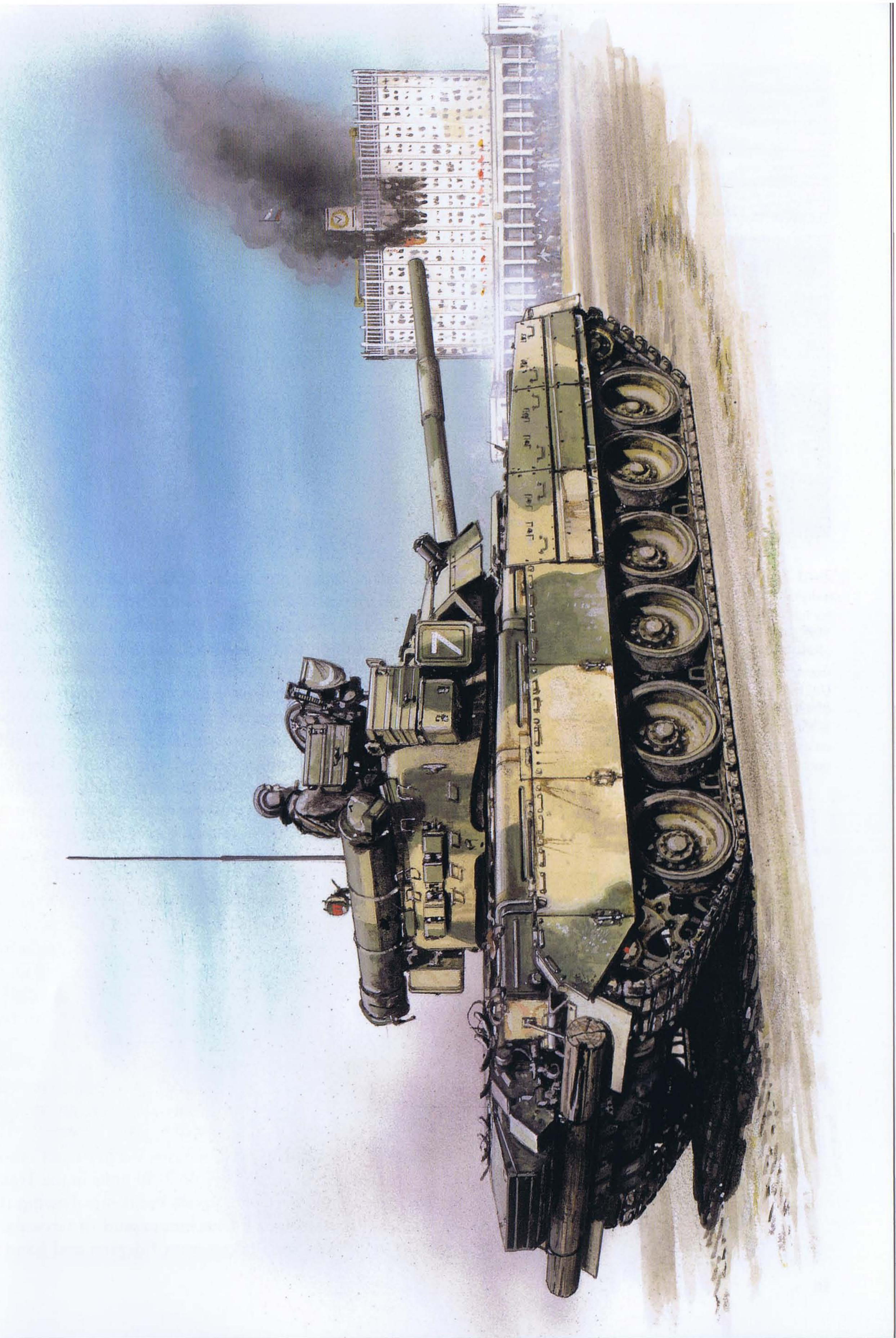
T-80 AT THE CROSSROADS: THE SOVIET COLLAPSE

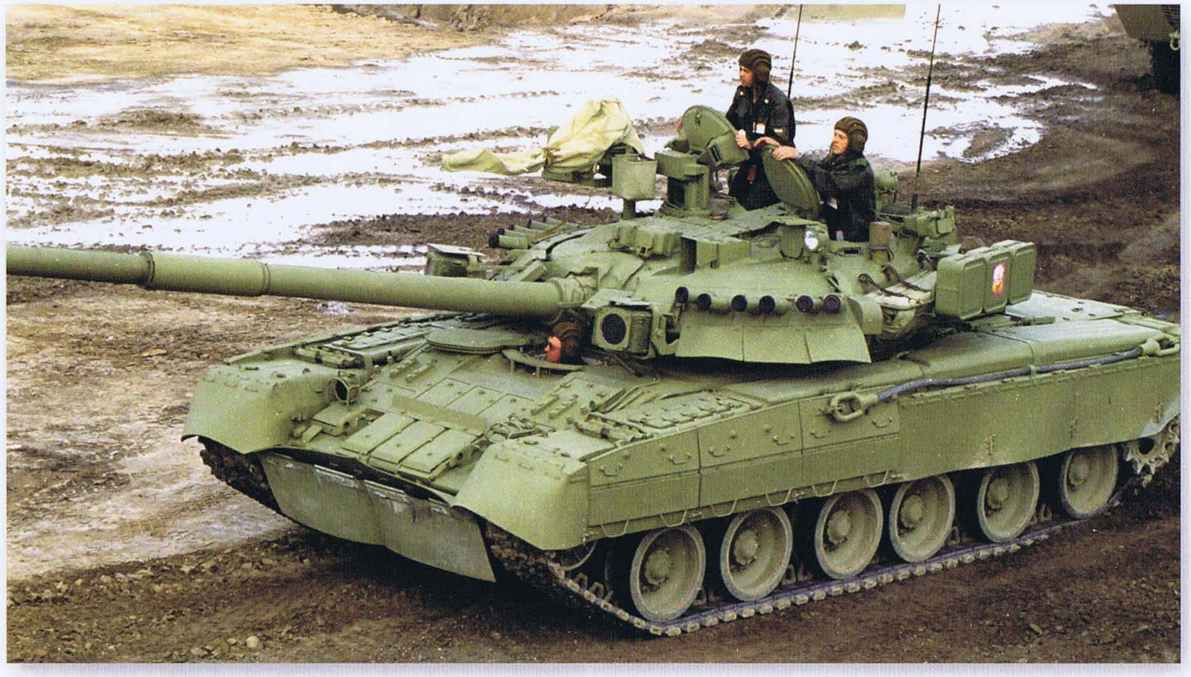
At the time of the Soviet collapse in 1991, the T-80 was the premium tank of the Soviet ground forces, deployed with the most combat-ready Soviet units. According to documents from the CFE Treaty, T-80 strength in November 1990 west of the Urals was 4,874. Of this strength, the vast majority was deployed against NATO, with some 3,020 T-80Bs and T-80BVs with six tank divisions and six motor rifle divisions in the GSFG and about 600 in a tank and motor rifle division in the Northern Group of Forces in Poland. A modest 705 were deployed with units in Russia, notably with the 4th GTD and 2nd Taman Guards MRD in the Moscow area, and in smaller numbers in five motor rifle divisions in the Leningrad Military District. The remaining T-80s were located in various schools, training units, and depots. Additional T-80s were located east of the Urals, such as at the Omsk plant and in depots and training schools, but these were relatively few in number. Total T-80 production was probably more than the 4,874 tanks reported under the CFE Treaty, as none were listed in the Ukraine, even though about 320 were at the Kharkov plant, and there were probably some T-80s at the Omsk tank plant as well.

D

T-80UD, 4TH GUARDS KANTEMIROVSKAYA TANK DIVISION, MOSCOW, OCTOBER 4, 1993

When first delivered to the 4th GTD in the late 1980s, the T-80UD tanks were finished in the standard three-color scheme. When repainted after extensive training use, this was simplified to dark green and gray-yellow as seen here. The tactical number of this tank, 187, is seen in shortened form on the right side due to a lack of space. The two last digits, "87," are also found on the rear-facing red night formation light at the top of the turret. The 4th GTD traditionally used a pair of oak leaves as its symbol, usually painted on the searchlight cover, and the "2" in the center indicates the 13th GTR. This was one of the tanks taking part in the confrontation between Boris Yeltsin and the Russian parliament, and the burning "White House" can be seen in the background after being shelled by several tanks.





Omsk used the T-80UK command tank as the basis for further evolution of the T-80U family through a series of modest upgrades. This example on display in the UAE in 1995 shows some of the added features, such as the Shtora missile jammers on either side of the main gun. (Author)

As a result of the Soviet collapse, nearly all of the T-80 tanks were in Russian control except for about 350 tanks, mainly T-80UD, located in Ukraine at the Kharkov plant and less than a hundred in Belarus. The tanks stationed in German and Poland were gradually repatriated back to Russia through the mid-1990s. The collapse of the Soviet Union threw the Soviet tank industry into crisis. At the time, only three of the five assembly plants were still active. Nizhni-Tagil was manufacturing the T-72B, Kharkov was manufacturing the T-80UD, and Omsk was manufacturing the T-80U; Leningrad and Chelyabinsk were no longer very active in tank assembly. Kharkov is located in Ukraine, and so was split off from the other Soviet plants in Russia. The political turmoil was accompanied by a precipitous decline in defense funding and virtually no new tanks were funded in Russia from 1991 to about 2005, although some production continued based on existing contracts and parts.

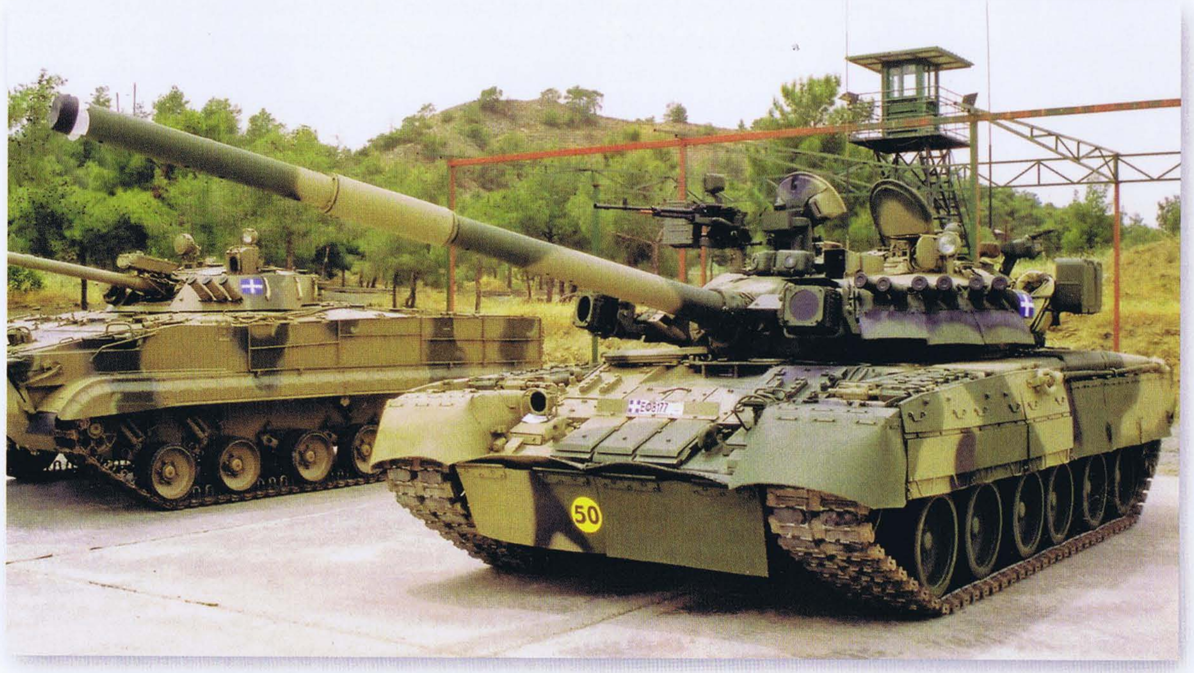
The T-80UD received international attention in October 1993 when six tanks of the 13th Guards Tank Regiment (GTR), 4th GTD, took part in a dispute between President Boris Yeltsin and political rivals holed up in the "White House" of the Supreme Soviet of the Russian Federation. The tanks fired a dozen projectiles against the building, ending the political standoff.

The collapse in state funding led to intense rivalry between the two surviving Russian tank plants at Nizhni-Tagil and Omsk. The Omsk Transport Industry Plant (Zavod Transportnogo Mashinostroeniya: ZTM) tank plant attempted to expand its design capabilities to compete with Nizhni-Tagil. Fairly or not, the fate of the two programs was strongly affected by civil war in a remote corner of Russia – Chechnya.

The attempted secession of Chechnya in the Caucasus led to Russia's most protracted and bitter war of the 1990s. There were no T-80 units in the Trans-Caucasus Military District at the time of the Soviet break-up. During the build-up in 1994 prior to the assault on the Chechen capital of Grozniy, a number of T-80B and T-80BV tanks were taken out of depots and handed over to units that had not received any training on the T-80. Unfamiliar with the voracious appetite of the T-80 turbine engine, crews left the engines running at idle, not realizing that the tank consumed as much fuel at idle as when running, thereby quickly exhausting their fuel supply. The bulk of the T-80BV tanks in Chechnya came from units outside the region, such as the 81st Guards Petrovskiy Motor Rifle Regiment (MRR) of the 90th Guard Tank Division formerly in Germany, the 129th Guards MRR from the 45th Guards MRD in the Leningrad Military District, and the 245th Guards Gneznenskiy MRR from the 47th GTD. At least two of the units, the 81st and 129th Guards MRR, lacked the explosive cassettes for their Kontakt reactive armor. During the assault on the Chechen capital of Grozniy on December 31, 1994, tank units were hastily ordered into the city without adequate tactical planning, and with crews ill-trained to carry out their mission. The result was a slaughter: about 70 percent of the 200 tanks involved in the attack were knocked out. Russian newspapers and television were full of grisly pictures of destroyed Russian T-72 and T-80 tanks. One T-80BV of the 133rd Guards Separate Tank Battalion suffered 18 RPG penetrations and lost a track to a mine. At least 17 T-80B and T-80BV tanks were lost during the fighting around Grozniy in 1994–95.

The T-80 was singled out by the opponents due to problems with its expensive turbine engine, its high fuel consumption, and the vulnerability of its ammunition carousel to catastrophic detonation. Many Chechen fighters were former Soviet soldiers and familiar with Russian tanks. Although the T-80B was very well protected against the RPG-7 antitank rocket launcher from frontal attack, its Achilles' heel was the upper surface of the engine deck, where a well-aimed rocket fired from a tall building could penetrate the thin armor of the engine deck, then pass through the unarmored firewall between the engine and fighting compartment, striking the ammunition around the turret. This sparked a chain of explosions of the tank propellant, causing the tank to "lose its cap."

Cyprus was one of the export clients for the Omsk T-80U, buying 41 tanks for its National Guard's 20th Armored Brigade, which serve along with the BMP-3. This is one of the T-80UK acquired that is fitted with the Shtora passive defense system. (Richard Stickland)



In an intemperate speech at the Kubinka armor center two months later, Defense Minister Pavel Grachev blamed poor Russian tank design as one of the causes of the Chechen debacle. These criticisms diverted attention away from the real causes of the fiasco, including poor troop training, incompetent tactics, and poor operational planning by senior Russian Army leadership. The head of Russian tank development Colonel-General Aleksandr Galkin, continued to argue that the T-80U was a superior design to the rival T-72B.

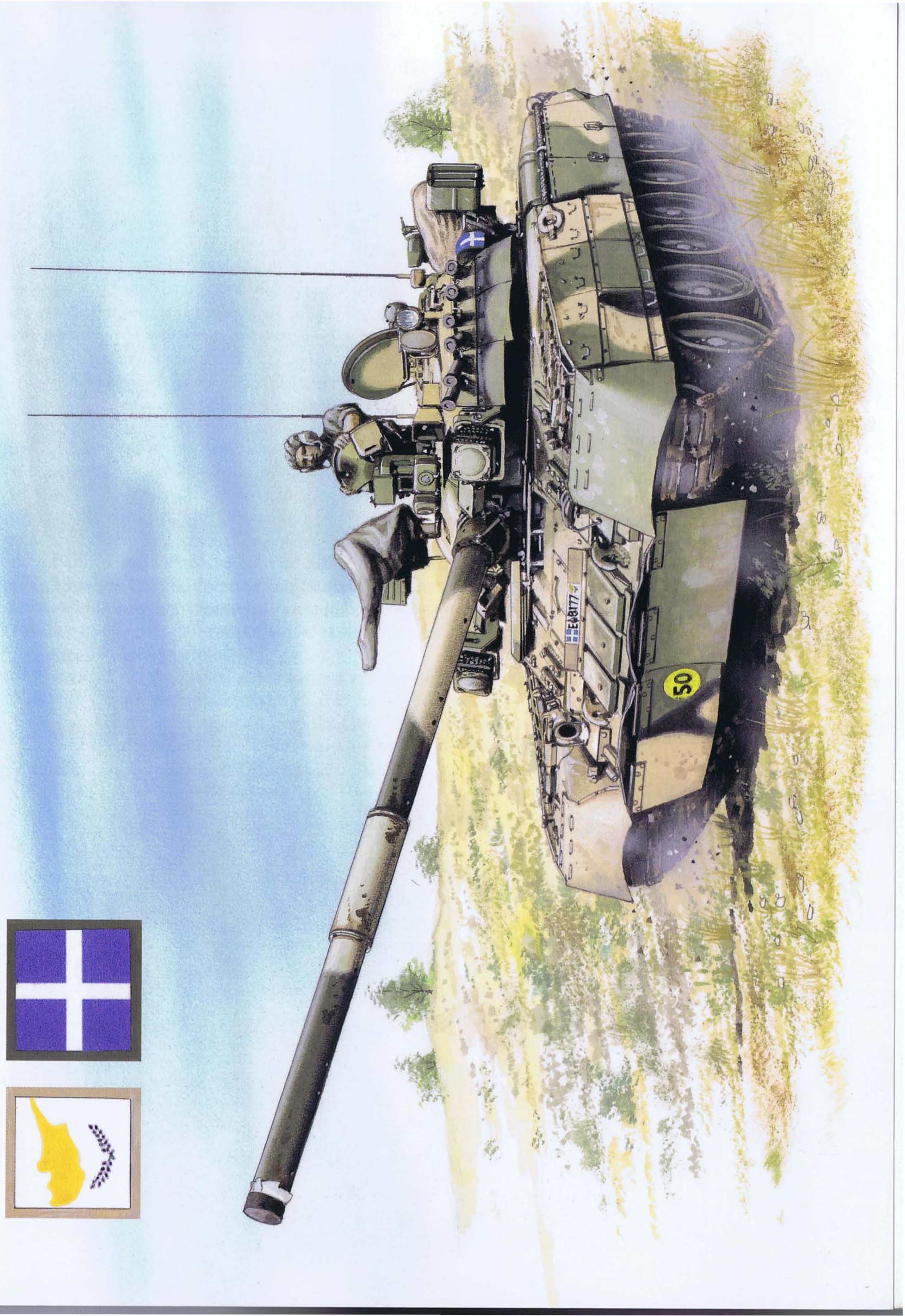
Once again, the fate of the Russian tank program was determined by politics more than technology. Having been the past victim of Kremlin politics, the Uralvagon plant proved to have learned its lesson. To avoid the taint of the Chechen war, the new T-72BU version of the T-72 tank was renamed the "T-90." Eduard Rossel, the governor of the Sverdlovsk region where the Nizhni-Tagil plant was located, vigorously campaigned for the T-90 as the future Russian tank. In 1996, the Russian Army announced that the T-90 would be the preferred tank for the immediate future. The decision made little difference in the short run, as there was no procurement funding for either the T-80U or T-90 for almost a decade. In the event, the T-90 prospered, as the Uralvagon plant at Nizhni-Tagil had an extensive commercial business in railroad equipment that kept the factory alive until state orders for tanks resumed in 2005. In addition, Nizhni-Tagil had better success in the export market, winning some large T-72 and T-90 sales to India and several other countries. In contrast, Omsk had a very difficult time winning export orders. The T-80U was significantly more expensive to purchase and operate than the T-72, and the Russian Army decision in favor of the T-90 did not help the T-80's export prospects. In addition, it faced competition from the Ukrainian Kharkov tank plant, which was offering the T-80UD/T-84 on the export market. Whether the T-90 was favored or not, by the late 1990s the T-80 was the backbone of Russian tank forces. Older tanks had been retired due to a lack of funds and of the 5,546 tanks still in service west of the Urals in 1997, 3,210 were T-80 tanks, almost 60 percent.

Omsk still had some state funding left over from the Soviet days to develop and manufacture a command tank version of the T-80U, the T-80UK (Obiekt 630A). Omsk used this program as a venue for a series of small but important improvements on the T-80U to make it more attractive in the export market. Soviet night-vision development had generally fallen behind NATO developments by the 1980s, with the failure to adopt thermal imaging sights. The Agava thermal sight was offered on the T-80UK, though one foreign assessment considered it more than a decade behind contemporary NATO thermal sights. Omsk added other options to the package, including the

E

T-80UK, 20TH ARMOURED BRIGADE, CYPRIOT NATIONAL GUARD

In the late 1980s, the Soviet Army began to adopt a factory applied three-color disruptive camouflage scheme closely resembling the US Army's US Mobility Equipment Research & Design Command (MERDC) scheme. The colors consisted of the usual dark green, with a pattern of gray-yellow (*sero-zheltiy* KhS-5146) with black crow's feet (*cherniy* KhS-5146). These schemes remained common during the 1990s at both Russian and Ukrainian tank plants including Omsk, and were often applied to export tanks, as is the case here. The Cypriot National Guard applied its own tactical markings to its tanks, including the Greek flag on the center-left side of the turret on a panel behind the Kontakt-5 ERA, and the Cypriot flag on the right side. The vehicle license plate on front and rear has the Greek flag to the left, and the vehicle number preceded by EF in Greek for *Etnike Fronra* (National Guard). In some cases the standard NATO-style yellow bridge-weight circle was painted on front and rear.



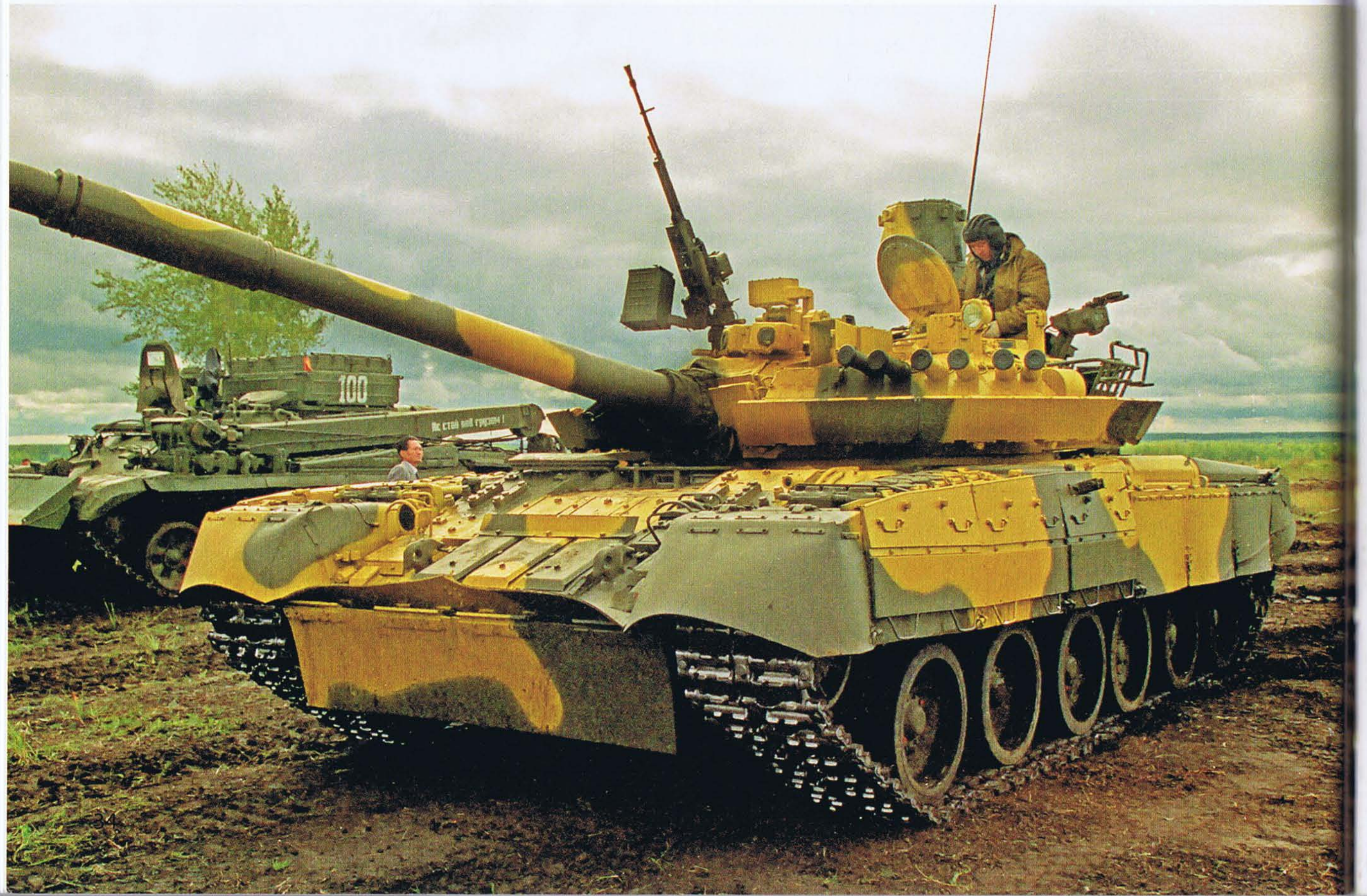
T-80 Tank Strength 1990–2000*

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
USSR	4,876	4,907									
Russia			3,254	3,031	3,004	3,282	3,311	3,210	3,178	3,159	3,058
Ukraine			350	350	345	342	322	322	273	273	270

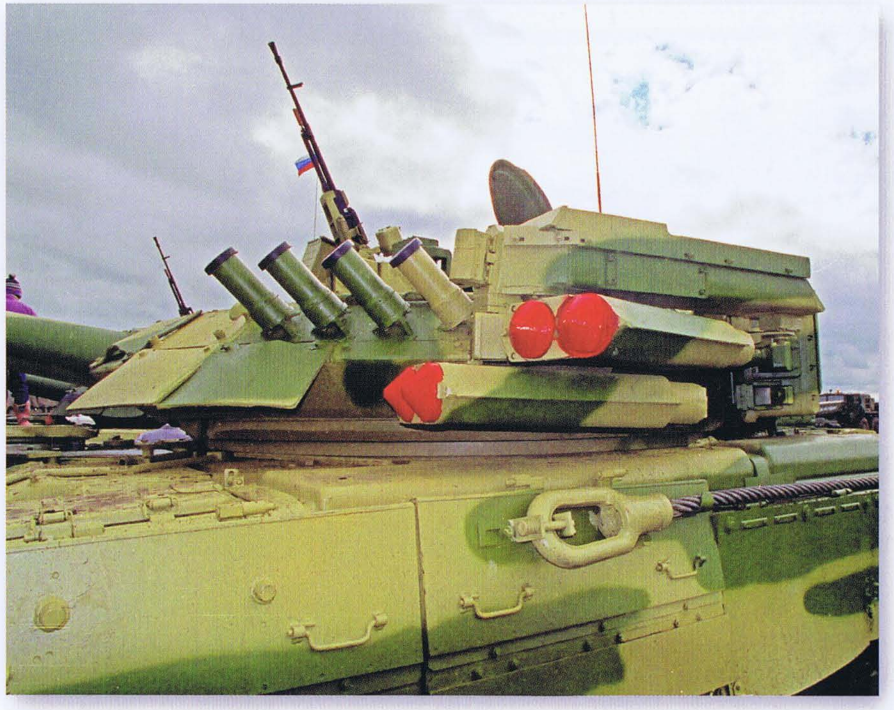
*Tanks deployed west of the Urals

Shtora electronic defense system, and the uprated GTD-1250 engine and other upgrades. Shtora included an electro-optical jammer to interfere with the optical command link used by many standard NATO anti-tank missiles such as Milan, HOT (Haut subsonique Optiquement Téléguidé: High Subsonic Optical Guided), and TOW (Tube-launched. Optically tracked, Wire-guided). Apart from these upgrades, the T-80UK also had the usual features of a command tank, namely a second radio and a land navigation system.

A handful of export orders for the T-80U did materialize, though they were fulfilled mostly by using undelivered inventory from the Omsk plant. Morocco acquired about five T-80 tanks in the late 1980s, ostensibly for testing for a future tank requirement; it is widely believed that they ended up in the hands of US, British, and German intelligence agencies. Russia sold Britain one T-80U in 1992 as a goodwill gesture connected with President Boris Yeltsin's visit to Britain in 1992. Sweden evaluated the T-80U for its tank competition starting in 1993, but finally settled on the Leopard 2. The Russian government owed South Korea a substantial amount of money from the Soviet period, and partly paid these debts through the sale of military equipment. The Republic of Korea Army received about 80 T-80U tanks from 1996 to 2005. These are used primarily by "opposing forces" units for training. Cyprus acquired 41 T-80U tanks, including 14 of the new T-80UK command tanks in 1996–97.



The T-80UM-1 Bars incorporated the Arena active protection system, evident both from the sensor mast on top of the turret and the belt of cassette launchers around the base of the turret. (Author)

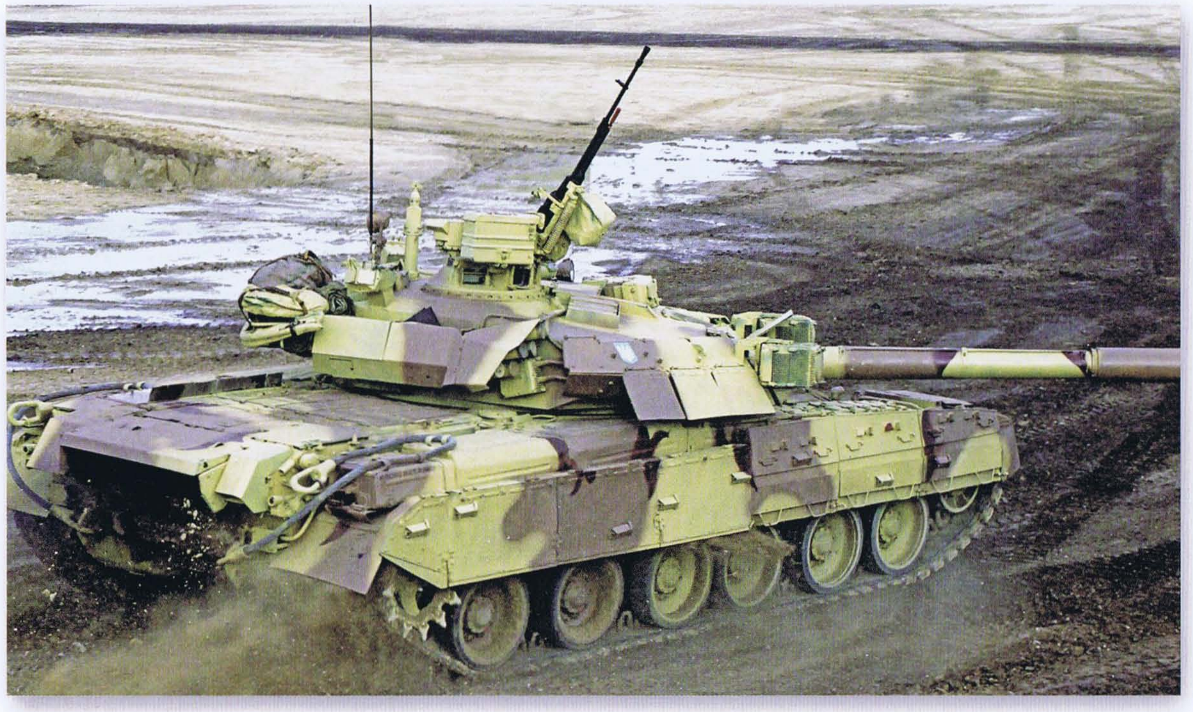


The older Drozd system was revived as an option on the T-80UM-2 as seen here at the Svetliy range near Omsk in 1997. The Drozd-2 system includes four 3UOF14 antimissile rockets on either side and a millimeter wave radar above the launchers to detect the incoming antitank missile. (Author)

Omsk attempted to reinvigorate international interest in the T-80 by more elaborate improvements, including active protection systems as detailed below. Export sales were too small to keep the Omsk tank plant busy, and in spite of a few small state orders for tank rebuilding, the plant went bankrupt in 2006. At the time of writing, the Russian government planned to consolidate the tank business around Uralvagon in Nizhni-Tagil, with Omsk assigned tank rebuilding efforts as well as some design work. The Russian Army began to fund upgrades for its aging T-80 fleet in the 2007 defense budget.

ACTIVE PROTECTION

The Soviet Union was the first army to adopt an active protection system for tanks (APS; in Russian *Kompleks aktivnoy zashchity tanka*: KAZT, or Tank Active Defense System), which was designed to protect the tank against the threat of antitank guided missiles. A number of experimental systems were developed, starting in the late 1940s, but were not viable due to the lack of adequate sensors or computers. The Drozd (Thrush) was the first to reach service use and was developed by KBM starting in 1977. A small number of Drozd were manufactured in 1981–82 for the Soviet Naval Infantry at Omsk on the T-55AD tank, but the Naval Infantry switched to the less cumbersome Kontakt reactive armor in the late 1980s. The Drozd system identifies an incoming antitank missile with one of its two small Doppler radar sensors. These only lock-on if the target is moving at speeds of 70–700 meters per second to avoid the system engaging small-arms fire and other high-speed projectiles. After acquiring the incoming projectile, the Drozd's computer



The definitive production version of the T-84 introduced a welded turret and many detail changes from the T-80UD in terms of turret stowage. The Ukrainian Tasko firm in Kiev produced the 4S22 explosive panels for the Kontakt-5 reactive armor.

determines which of its eight projectiles to launch and engages the missile 7m from the tank. The 107mm rocket contains a high-explosive warhead with a pre-fragmented steel casing that sprays the incoming missile with fragments, destroying it before it reaches the tank. One of the main problems with the Drozd was that it offered a relatively narrow protected zone in front of the tank.

As the T-80 was expected to be the new standard tank of the Soviet Army in the 1980s, much of the active defense studies shifted to it. In 1976 Kharkov, in cooperation with KBM, was assigned to study incorporation of the new Shater (Tent) APS on the T-80 as part of the experimental Obiekt 476M program. This expanded the defensive zone from the 80 degrees of the Drozd to 200 degrees, using an array of 20 cassette launchers. Another APS called Dikobraz (Porcupine) was also studied at this time. In the event, no APS system was ready for serial production prior to the collapse of the Soviet Union in 1991.

The next KBM active protection program was codenamed "Arena," which evolved from the Shater concept. The Arena was first fitted to the T-80B series on the experimental Obiekt 219E, later called T-80BM1. The

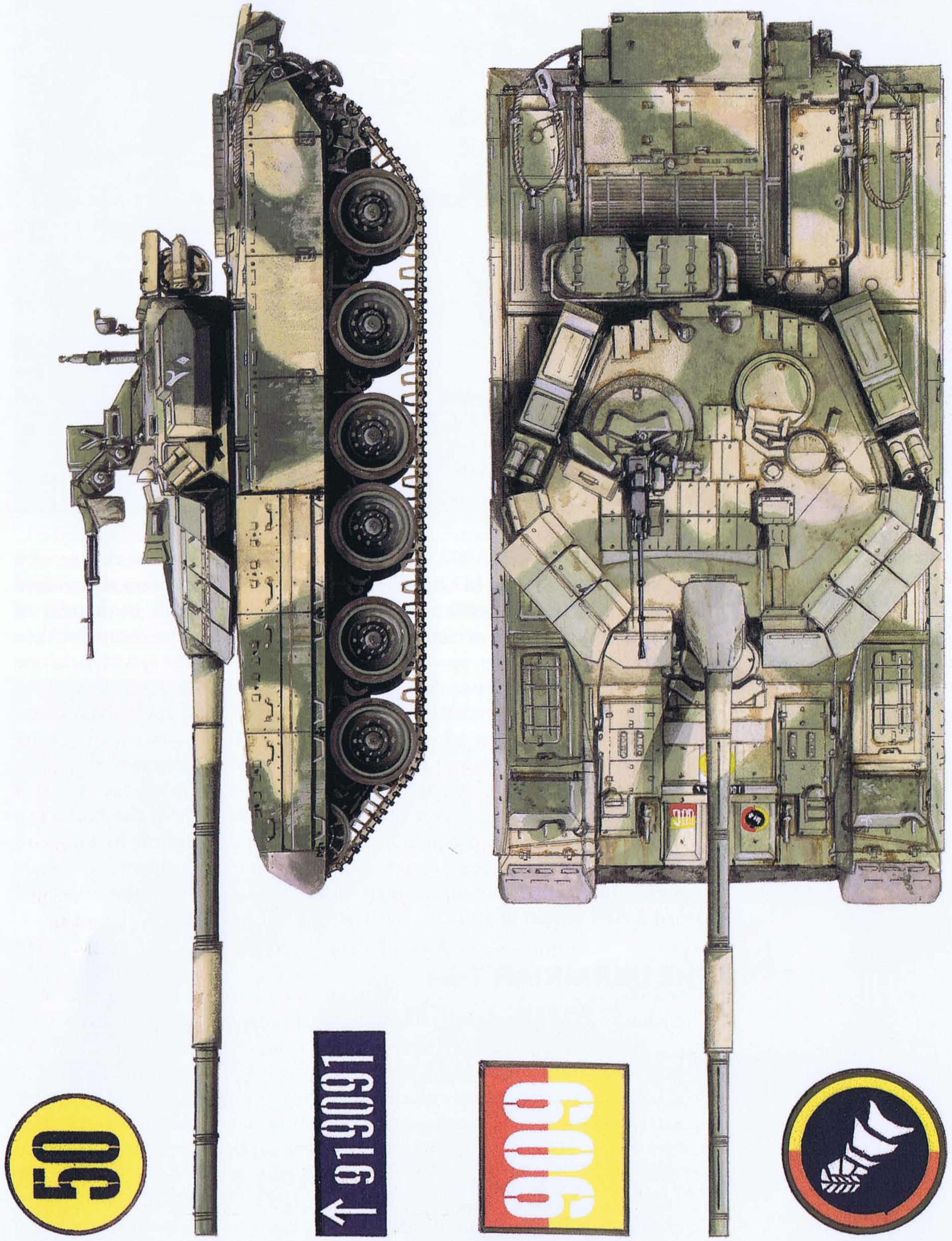
F

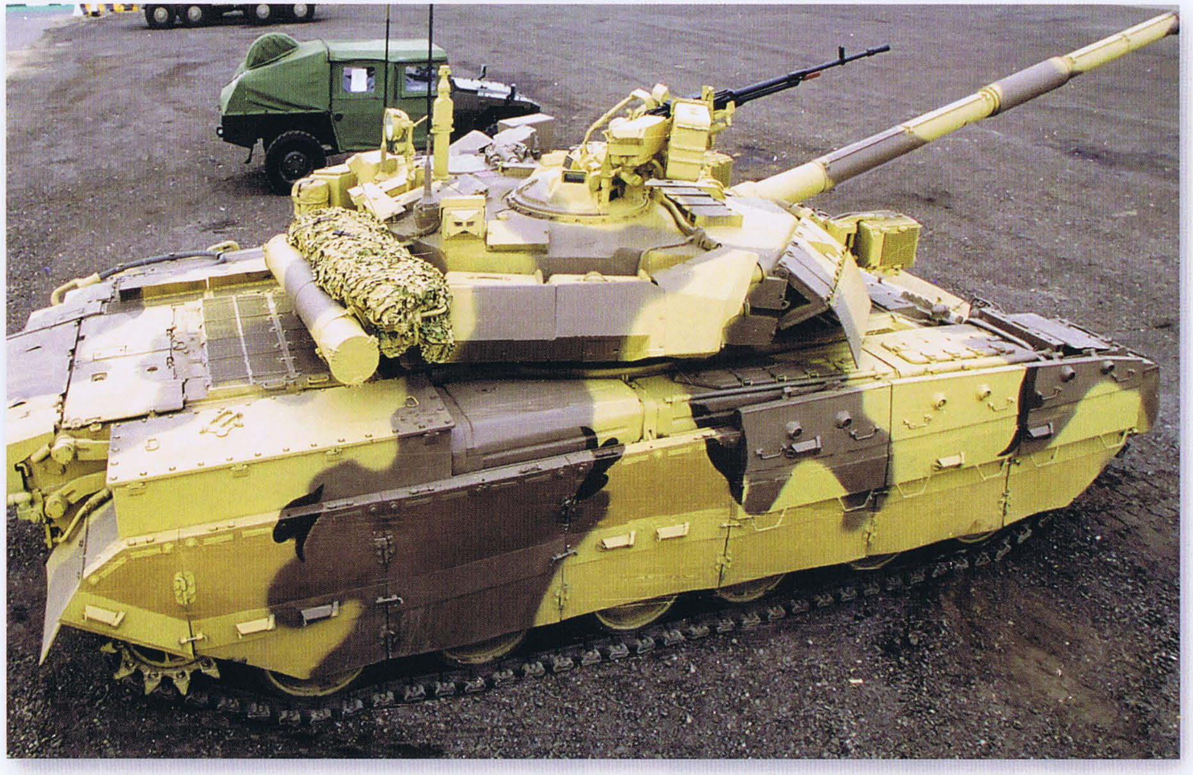
T-80UD (OBIEKT 478BE), AL-ZARAR, 41 HORSE, 1 ARMOURED DIVISION, PAKISTAN ARMY, 2005

Some of the first T-80UD tanks supplied to Pakistan were delivered in the standard Soviet-era three-tone scheme, though the final batch of tanks with welded turrets were generally delivered in a two-tone scheme without the black "crow's feet". Some Ukrainian accounts suggest this was dark green/lettuce green, but photos suggest the usual gray-yellow. Pakistan Army tactical markings remain heavily influenced by British practices and the four markings on the bow glacis plate from top to bottom are the bridge-weight circle, the census number plate, the arm-of-service square, and the regimental insignia. Some tanks also carry a tactical number in Urdu script on the rear turret stowage bin, in this case "20."

F

T-80UD (OBIEKT 478BE), AL-ZARAR, 41 HORSE, 1 ARMOURED DIVISION, PAKISTAN ARMY, 2005





The T-84M was a further evolution of the T-84 family, including the newer Nozh reactive armor. This overhead view shows the new armored box on the right rear fender containing the auxiliary power unit. (Author)

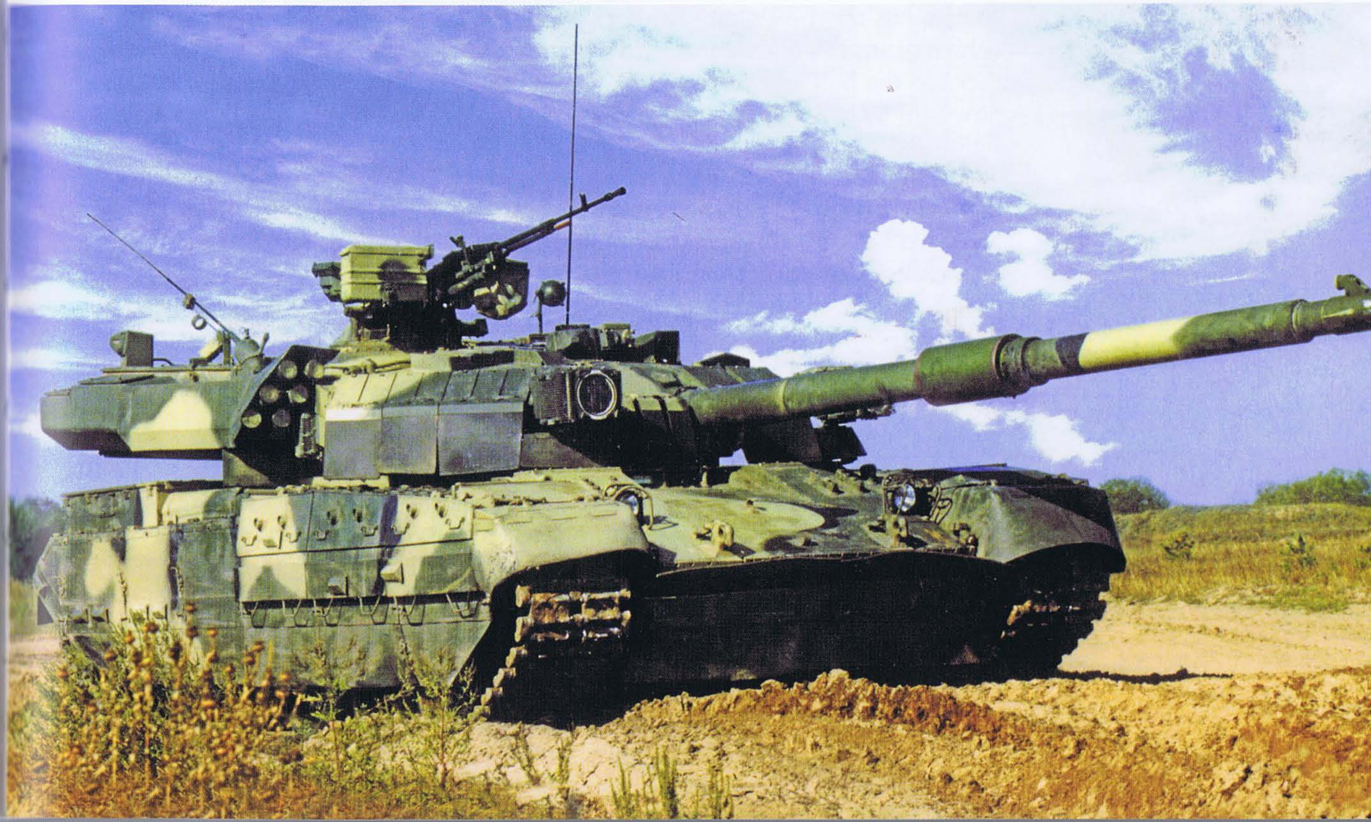
program was revealed in 1992, and was first publicly shown on a new version of the T-80U, the T-80U-M1 Bars (Panther) in 1997. The system is activated by a millimetric radar detection system, mounted on a stalk at the rear of the turret. Initial missile detection takes place at 50m and its computer then determines which countermeasure to activate. At 10–5m, the system fires one of its 20 antimissile cassettes that are arranged in a circular array around the turret. On launch, the cassettes are ejected upwards, and trail a small wire that detonates the cassette when it reaches its end. The cassette is somewhat similar to a Claymore mine, blasting a pattern of prefragmented pellets downward towards the target below. The Arena coverage in azimuth is about 340 degrees and KBM claims it doubles the survivability of the tank. The Bars did not enter serial production, but was part of an effort by Omsk to drum up business from the Russian army or from export clients. Curiously enough, Omsk also developed a variant of the T-80U with the upgraded Drozd-2 APS system in 1997, as the T-80UM-2.

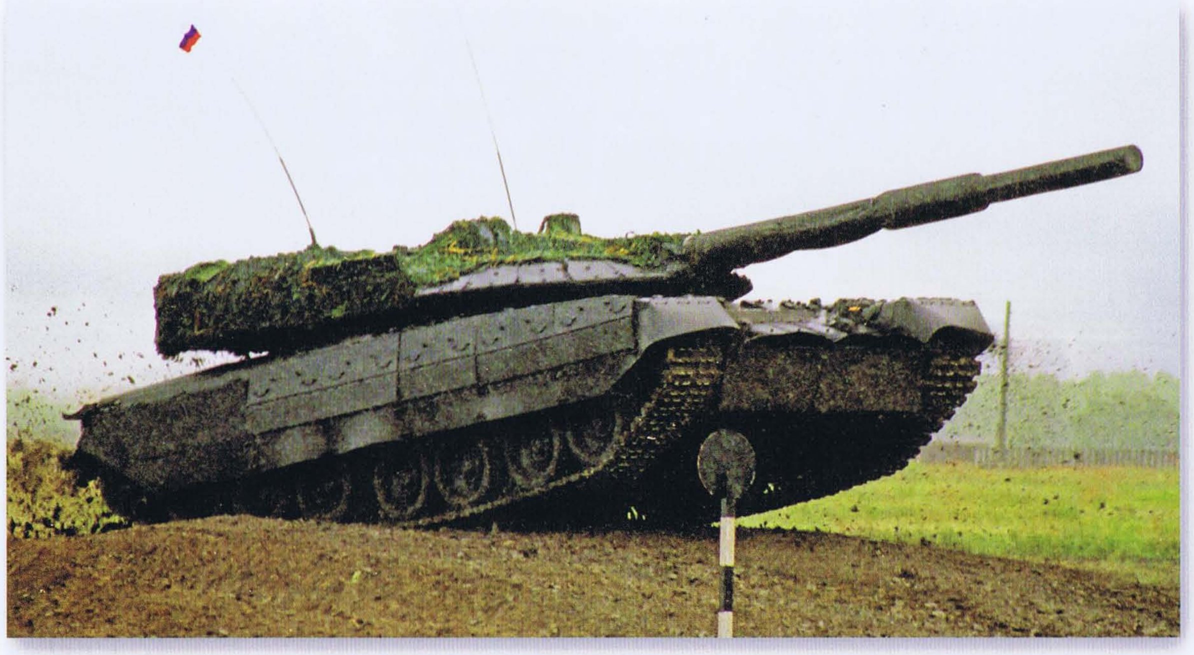
THE UKRAINIAN T-84

The Kharkov plant in newly independent Ukraine attempted to keep T-80 production alive there, but suffered from some unique problems. About 70 percent of the T-80UD came from plants outside Ukraine, mainly Russia. Production was 800 combat vehicles in 1991, but only 43 in 1992 and none in 1993 as the supply of components dried up. Since the Ukrainian state budget was too small to support any extensive production, the plant turned to the export market. In 1993, the Malyshev plant demonstrated the T-80UD to Pakistan and in the summer of 1995, two T-80UD underwent extensive testing there. In August 1996, Pakistan announced plans to purchase 320 T-80UD tanks from Ukraine. One critical component was the cast turret – this came from the Azvostal foundry in Mariupol, which had already ceased production; the other casting facility was at the Omsk plant in Russia. So the Malyshev plant's design bureau developed a new welded turret that resulted in the Obiekt 478BK (BK = *Bereza-Katanaya*: Rolled-armor birch tree), with the first completed in 1993. Ukraine began manufacturing its own version of the D-81 125mm gun at the KBA-3. Of the 320 tanks delivered to Pakistan in 1997–99, 145 used the original cast turret, including 52 tanks completed under Soviet contracts but never delivered, plus new tanks built with remaining Soviet-era turrets, and some tanks from Ukrainian army stocks. Ukrainian Army T-80 strength fell from about 350 tanks prior to the sale to 271 afterwards. The remaining 175 tanks were the new production Obiekt 478BE with the welded turret.

Improvements to the T-80UD continued, including continuations of efforts underway since the Soviet period. A pilot of the Obiekt 478D was in trials, this having fire-control upgrades that included the TPN-4 Buran night sight and the Aynet fire-control upgrade. Aynet was a system that was designed to fire high-explosive/fragmentation rounds with a time fuze to air-burst the round precisely over targets such as antitank missile positions by calculating the timing and correlating the range data with the fuze setting. Kharkov had been experimenting with the Shtora defensive suite since 1980, and sponsored the local development codenamed "Varta." The Obiekt 478D pilot was fitted with a modified suspension using aluminum wheels with steel rims based on the T-64 configuration. A number of other upgrades were considered but rejected, including a thermal-imaging sight developed in Lvov, and the more powerful 1,500hp 6TD-3 engine. It was eventually realized that too many innovations would lead to protracted development, so pilots were built of the Obiekt 478DU and Obiekt 478DU2, which kept the T-80 suspension and 1,000hp engine. A prototype was dispatched to the

The T-84 Oplot introduced a bustle autoloader to the T-84 design to permit the use of longer APFSDS projectiles and to reduce the vulnerability of the tank ammunition stowage to catastrophic detonation. (KhKBM)





The Obiekt 640 Black Eagle was an attempt to rejuvenate interest in the T-80 in the late 1990s, but lacked sufficient state support to reach production. It employs a new universal turret with rear autoloader bustle and new Kaktus reactive armor. This feature may reappear during a T-80 modernization program scheduled for later in the decade. (Author)

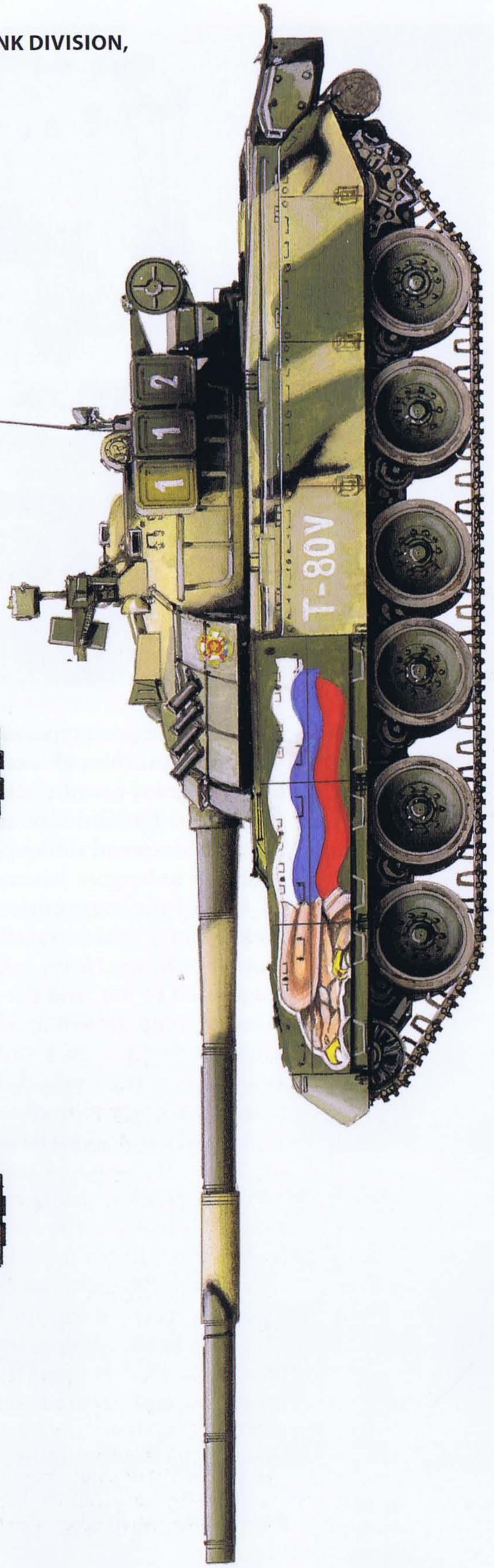
International Defense Exhibition (IDEX) arms show in Abu Dhabi in 1995 as the "T-84 Supertank." Further evolution of the T-84 continued in Ukraine as the Obiekt 478DM, which debuted at the 1999 IDEX show in the United Arab Emirates (UAE) as the T-84M. The T-84M was the culmination of a series of initiatives to develop local substitutes for Russian components, such as the new Nozh (Knife) reactive armor that used a series of small vertically oriented shaped charges to help break-up an incoming APFSDS penetrator.

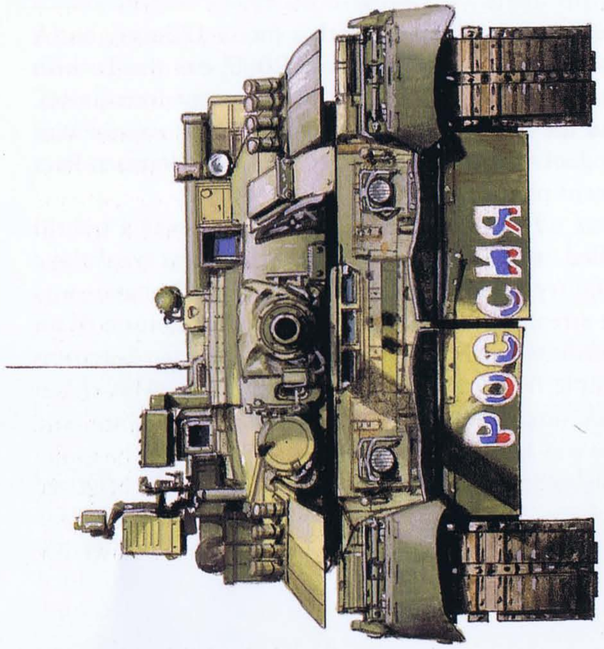
To avoid the vulnerability of the ammunition carousel, Kharkov was developing a new autoloader system on the Obiekt 478DU4 that eventually emerged as the T-84 Oplot (Stronghold). The autoloader housed 28 rounds behind protective blast-doors, while the remaining 12 were carried in armored racks in the hull and turret. Other features of the Oplot included the more powerful 6TD-2 engine, the hybrid Buran-Catherine thermal-imaging night sight, and a number of other upgrades. The Oplot was configured in part to address Turkish requirements for a new MBT. However, it was fairly evident that the Turks were not interested in using Soviet 125mm ammunition and preferred NATO 120mm ammunition. To help its export prospects, the Oplot was redesigned to accommodate a 120mm gun under the KERN-2.120 program, later renamed the T-84-120 and finally the Yatagan (Turkish saber). The bustle autoloader contains 22 rounds with 18 more rounds stowed in

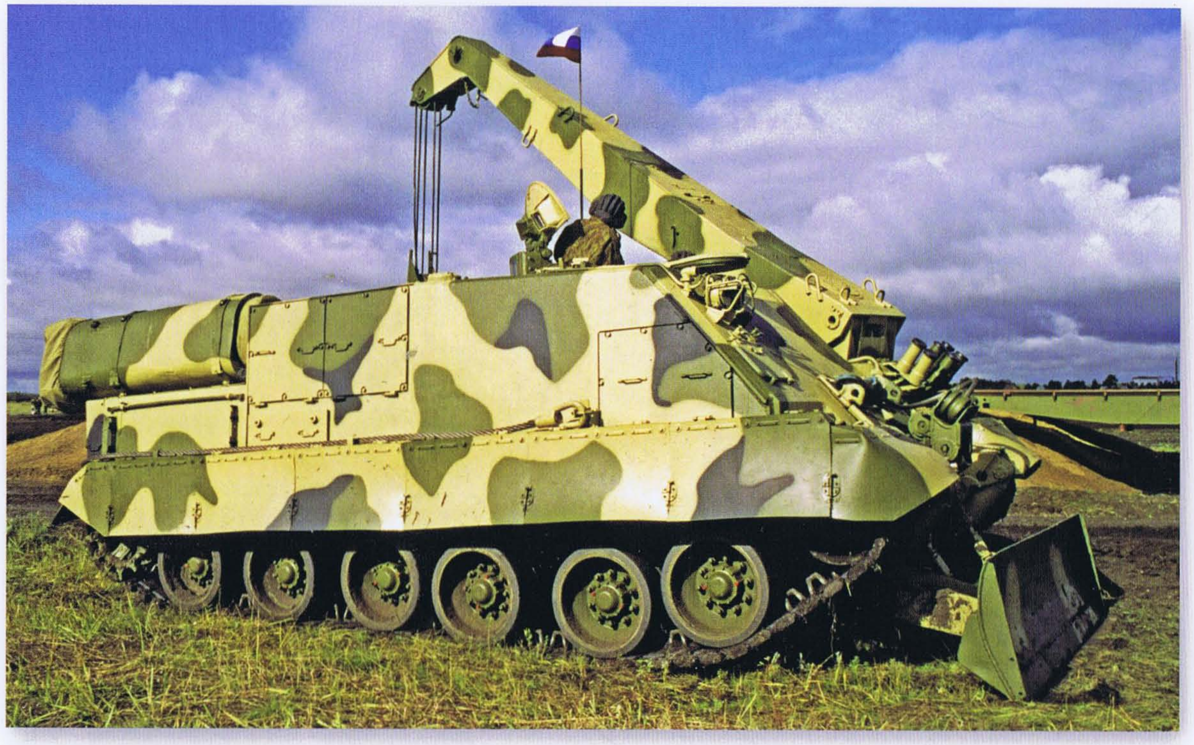
G T-80U, 4TH GUARDS KANTEMIROVSKAYA TANK DIVISION, NIIBT POLIGON, KUBINKA, 2006

The NIIBT Poligon is Russia's main tank testing facility and public shows are periodically held there to celebrate tanker's day and other holidays. This attractive scheme was applied to a T-80U in 2006 with an eagle trailing the Russian flag painted prominently on the side skirts. *Rossiya* (Russia) is painted on the lower front side skirt and also repeated on the rear of the wading trunk behind the turret. The vehicle tactical number "112" is carried on the turret stowage boxes. An intricate new version of the Guards emblem was painted on either side of the turret with the Moscow city crest, St George vanquishing the dragon in the center, with the traditional orange and black Guards ribbon behind a regimental cross surmounted by the Russian flag.

G T-80U, 4TH GUARDS KANTEMIROVSKAYA TANK DIVISION, NIIBT POLIGON, KUBINKA, 2006







The BREM-80U is a dedicated armored recovery vehicle based on the T-80U chassis and seen here during its debut in 1997.

the hull. The prototype was apparently fitted with a Swiss 120mm gun. A Yatagan went through extensive testing in Turkey in 2000, but the Turkish tank program became mired in funding difficulties and went into limbo. Ukraine had a hard time in the export market, as the end of the Cold War led to widespread dumping of tanks from both NATO and Warsaw Pact countries at bargain basement prices.

One of the more curious off-shoots of the T-84 program was a hybrid tank/infantry vehicle unveiled in 2001 as the BTMP-84 (*Boevaya tyazhelaya mashin pekhoty*: Heavy infantry combat vehicle). The T-84 tank chassis was lengthened to 9m, and the stretched hull permitted the incorporation of an infantry compartment immediately behind the turret. The infantry dismount squad of five sits on a simple bench seat in front of the engine bulkhead and access is via a tunnel through the engine compartment or via two roof hatches. A single prototype was built in 2001–02.

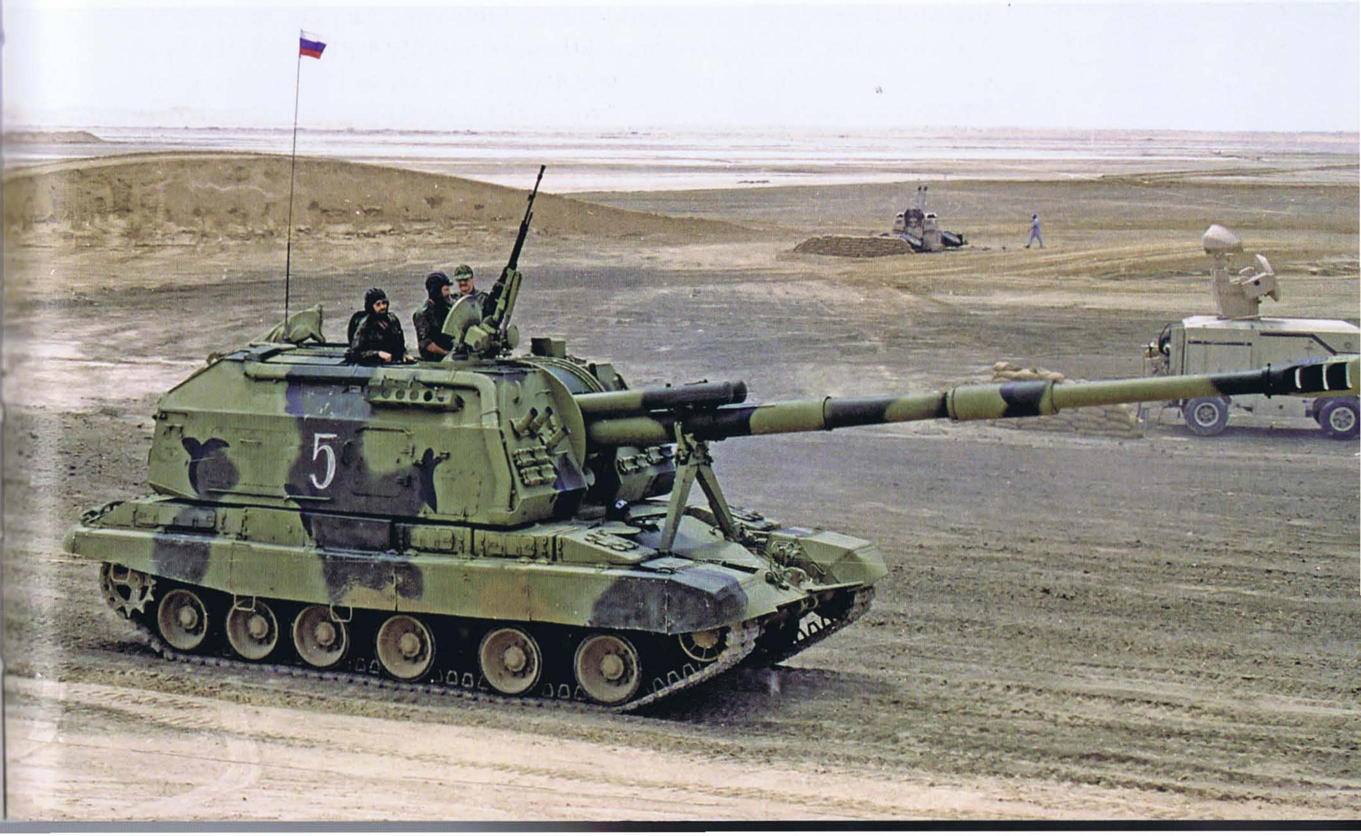
Several gun options have been proposed for variants of the T-84, including the Type 55L Bagira 140mm gun. To avoid dependence on Russia for guided 125mm missiles, the Luch design bureau in Kiev developed the 125mm Kombat missile. In the area of ERA, several Ukrainian research labs headed by Mikrotek began developing a next-generation type codenamed "Nozh," which uses a series of small shaped charges to break up APFSDS projectiles. This was accepted for production in 2003. In the area of active protection, Mikrotek headed a program called Zaslon (Shield), based on an earlier 1980s program called Baryer (Barrier). The kill mechanism is a high-explosive projectile with a pre-fragmented metal case akin to Drozd. A passive protection system called Kontrast was developed in 2002 which used special camouflage blankets to reduce the thermal and radar visibility of the tank.

Although the Ukrainian government made repeated promises to begin purchasing the T-84 tank for the Ukrainian Army, the budget was too small to do so. A total of ten T-84M were ordered and delivered in 2002–03. However, the government had problems paying for all the tanks, and four were sold off to the United States in 2003. A lack of orders from the Ukrainian government or from export clients left the Kharkov plant in grave economic straits and restricted their development efforts after 2005.

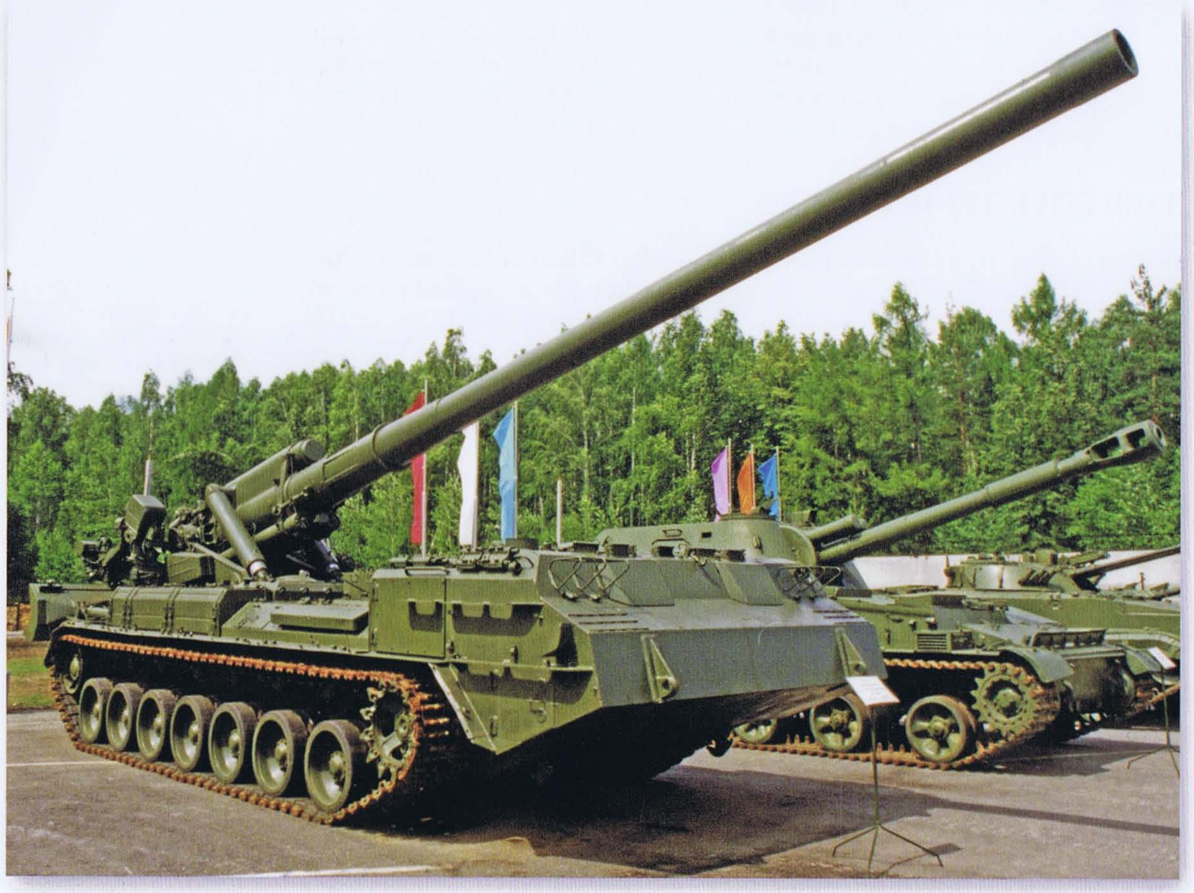
T-80 FOLLOW-ON TANKS

Design of a future Soviet tank began in the early 1980s, but had not reached fruition at the time of the Soviet collapse. Kharkov had continued work on a radical design with an elevated gun as a follow-on to the T-74/Obiekt 450 of the 1970s, with a series of studies called Buntar (Rebel), Bokser (Boxer), and finally the Obiekt 477 Molot (Hammer), with various armament and protection configurations. The Molot used an elongated hull with an externally mounted 152mm 2A83 gun and autoloader. The two-man turret crew sat in the hull under the gun, which was in an armored pod overhead. The Molot could carry up to 34 rounds of ammunition with a maximum rate of fire of 14 rounds per minute. The program has remained secret for many years, and it is not clear how many prototypes of this design were built or tested. This could still serve as the basis for a future Ukrainian tank. LKZ designed the Obiekt 292 with a 152mm gun, but with a more conventional turret. LKZ and VNII Transmash also developed designs using an elevated gun, though it would appear that these remained paper studies.

Omsk had a very modest design bureau through the early 1990s, but when it became one of the two surviving Russian plants after 1991, efforts were made to improve its engineering capability substantially as the Transport Industry Design Bureau (*Konstruktorskoe byuro transportnogo mashinostroyenie*: KBTM) headed by Boris M. Kurakin. Omsk focused on a near-term solution to the problems exposed in Chechnya, notably the



The 2S19 Msta-S 152mm self-propelled gun uses the running gear from the T-80 but it is powered by the diesel from the T-72 tank series. This one was demonstrated to the UAE Army at the Maqatra range.



The Obiekt 216 chassis was developed at LZK to serve as the basis for the imposing 2S7 Pion 203mm self-propelled gun, a relatively rare long-range artillery weapon developed primarily for firing tactical nuclear projectiles. (Author)

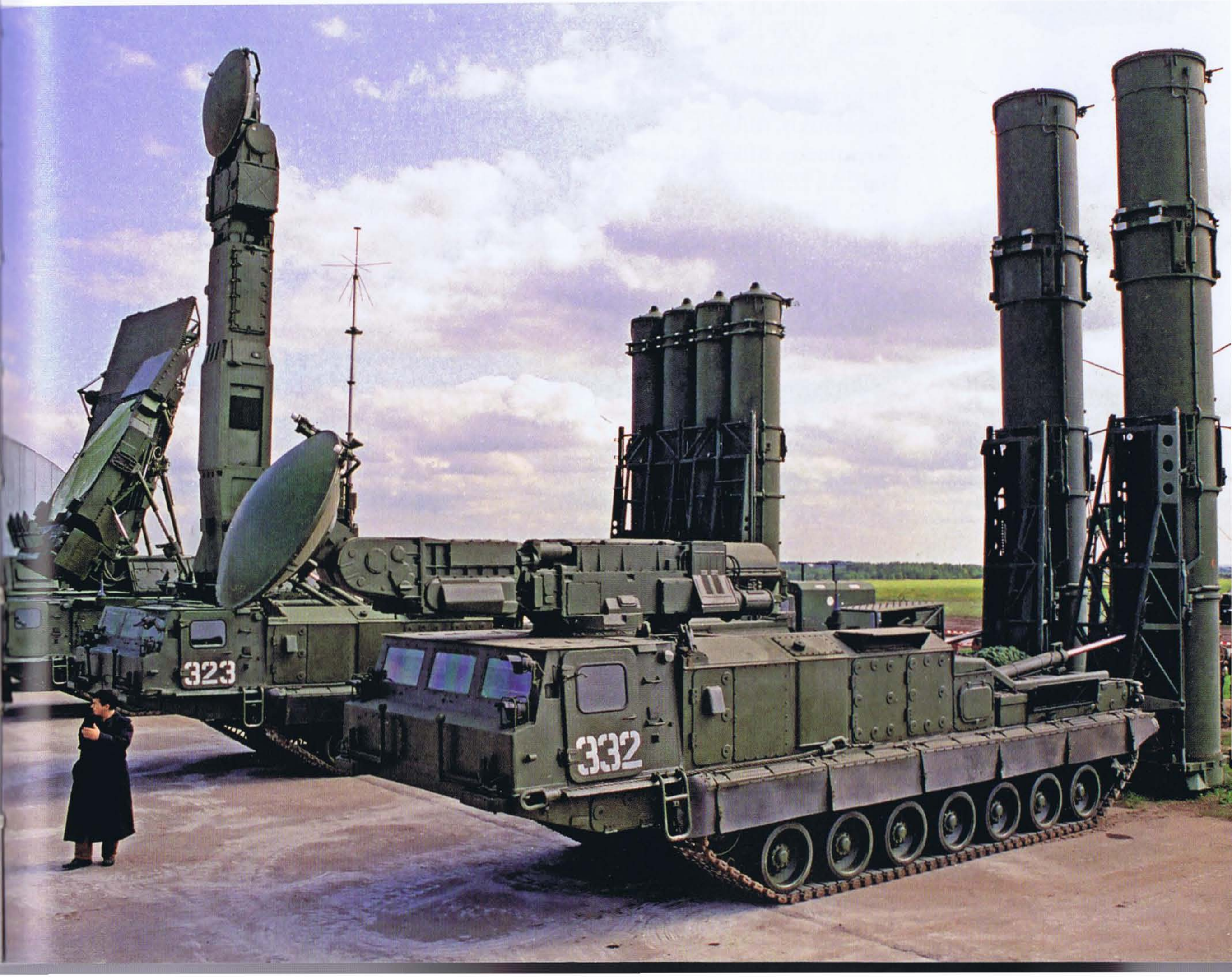
propensity of Soviet-era tanks to catastrophic ammunition fires due to the use of vulnerable carousel auto-loaders. Following the pattern of the new French Leclerc, Omsk developed a carousel autoloader fitted in the bustle of the turret, akin to the Kharkov Oplot. The second advantage of this configuration was that it could accommodate new APFSDS ammunition that had penetrators too long to fit in the usual carousel. Although the carousel could not accommodate all of the tank's ammunition, all of the vulnerable propellant casings could be moved into the turret bustle behind blast doors. The system retained the normal Korzhina autoloader in the tank hull, but it was only used for the less vulnerable projectiles. This system was incorporated in the new Obiekt 640 design, codenamed "Chorniy Oryol" (Black Eagle). The original configuration of the design was based on the T-80U chassis, but Omsk also envisioned an improved version that would lengthen the hull with one added road-wheel station. A mock-up was first shown in 1997 and an unfinished prototype was displayed in Siberia in June 1999. The new turret design incorporated a new generation of NII Stali integrated active armor called Kaktus. The Omsk plant showed various protective packages for the Chorniy Oryol at trade shows, including both Arena and Drozd. In the end, the program suffered from Omsk's financial difficulties, and it did not progress beyond the prototype tanks. However, the bustle autoloader has been packaged as a universal turret upgrade and could emerge as an element of future Russian T-80 modernization programs.

Specialized T-80 Derivatives

In 1997, Omsk unveiled a dedicated armored recovery vehicle (ARV) based on the T-80U called the BREM-80U. This is reminiscent of heavy ARV designs in the West such as the Bergepanzer or Leclerc ARV, rather than the lighter types with simple jib cranes typical of the Soviet Army. The BREM-80U is fitted with a large crane on the front left corner with 18 metric tons capacity. The superstructure at the front of the vehicle contains a heavy winch for extracting vehicles in conjunction with a bow-mounted bulldozer blade; the winch has 35 metric tons pulling capacity. The vehicle is fitted with a work platform over the engine deck with welding equipment and spare parts stowage. In 2000, the Kharkov plant displayed an equivalent ARV called the BREM-84. Although similar in general configuration to the Omsk design, it was powered by a diesel rather than turbine engine, and used a mirror-image configuration with the crane fitted on the right side of the superstructure rather than the left side.

Apart from the various armored vehicles derived from the T-80, a number of other armored combat vehicles were built using T-80 components, most often the suspension. The Obiekt 216 was developed by LKZ as the chassis for the 2S7 203mm Pion self-propelled gun and used suspension components from the T-80 tank. The Obiekt 316 was the chassis developed by the Uraltransmash design bureau in Sverdlovsk for the 2S19 Msta 152mm self-

The S-300V (SA-12 Gladiator/Giant) air defense missile system uses the LKZ Obiekt 800 series of transporters derived from the T-80. In the foreground here is a 9A82 transporter-erector-launcher-radar (TELAR) on the Obiekt 831 chassis carrying a pair of 9M82 (Giant) missile canisters; behind it is the 9A83-1 on the Obiekt 833 chassis carrying four launcher canisters and a command radar. Beyond those are other radar vehicles of the system. (Author)



propelled gun and used running gear from the T-80. LKZ also used T-80 components as the basis for a family of large tracked vehicles including the S-300V (SA-12 Gladiator) air defense missile system.

FURTHER READING

The T-80 remains somewhat more mysterious than the T-64 and T-72, as development is still underway in Russia and Ukraine. There has been no history of the T-80 comparable to the Saenko/Chobitok T-64 history or the Ustyantsev/ Kolmakov T-72 history. Semi-official histories of the T-80 have been published by LKZ under Popov's name and by VNII Transmash by Ashisk, but these are not well detailed. One of the most remarkable documents on Soviet tank development in the 1970s is the recently released diaries of Aleksandr Morozov, edited by V. L. Chernyshev and released on the www.btvt.narod.ru website. There is considerable coverage of T-80 development in Russian magazines such as *Tekhnika i Vooruzhenie*. The author has also had the opportunity to interview members of the design bureaus from LKZ, KhKBM, VNII Transmash, NII Stali, and other organizations while attending various international arms shows since the early 1990s, as well as to inspect various versions of the T-80 and T-84.

n.a., *Tank T-80B: Tekhnicheskoe opisanie i instruktsiya po ekspluatatsii* (MO-RF: 2001)
Ashisk, M. V. et. al., *Tank brosayushchiy vyzov vremeni: k 25-letiyu tanka T-80* (Kaskad Poligrafiya: 2001)
Bachurin, N. et. al., *Osnovnoy boevoy tank T-80*, (Gonchar-Poligon: 1993)
Baryatinskiy, Mikhail, *Main Battle Tank T-80* (Ian Allan: 2007)
Baryatinskiy, Mikhail, *Tanki v Chechne*, (Zhelezdorozhno delo: 1999)
Hull, A., D. Markov, and S. Zaloga, *Soviet/Russian Armor and Artillery Design Practices: 1945 to the Present* (Darlington: 2000)
Karpenko, Aleksandr, *Raketnye Tanki* (Tekhnika Molodezhi: 2002)
Karpenko, Aleksandr, *Obozrenie otechestvennoy bronetankovoy tekhniki 1905–1995* (Nevskiy Bastion: 1996)
Lenskiy, A. G. and M. M. Tsybin, *Sovetskie sukhoputnye voyska v posledniy god Soyuza SSR* (Kompleks: 2001)
Popov, N. S. et. al. *Bez tayn i sekretov- ocherk 60-letney istorii tankovo konstruktorskogo byuro na Kirovskom zavode v Sankt-Peterburge* (Prana: 1995)
Saenko, Maksim and V. Chobitok, *Osnovnoy boevoy tank T-64* (Eksprint: 2002)
Ustyantsev, Sergey and D. Kolmakov, *Boevye mashiny Uralvagonzavoda: T-72* (Media-Print: 2004)
Veretennikov, A. I. et. al. *Kharkovskoe konstruktorskoe byuro po mashinstroyeniyu imeni A.A. Morozova* (IRIS: 1998)
Zaloga,Steven, *T-64 and T-80* (Concord: 1992)
Zaloga, Steven and David Markov *T-80U-Russia's Main Battle Tank* (Concord: 2000)

GLOSSARY

APFSDS	Armor-Piercing, Fin-Stabilized, Discarding-Sabot, a type of tank shell
DZ	*dinamicheskaya zashchita* (dynamic protection)
ERA	Explosive Reactive Armor
GSFG	Group of Soviet Forces in Germany
GTA	Guards Tank Army
GTD	Guards Tank Division
GTR	Guards Tank Regiment
HEAT	High-Explosive Antitank
HOT	Haut subsonique Optiquement Téléguidé (High Subsonic Optical Guided), a French antitank missile
KB-3	Konstruktorskoye Biuro-3 (Design Bureau 3), tank design bureau of LKZ, called Spetsmash after 1992.
KBA	Konstruktorskoye Biuro Artsistem (Artillery Systems Design Bureau of the NPO Bolshevik Plant in Kiev).
KBM	Konstruktorskoye Biuro Mashinostroeniya (Industry Design Bureau) in Kolomna
KBP	Konstruktorskoye Biuro Priborostroyeniya (Instrument Design Bureau) in Tula
KBTM	Konstruktorskoye Biuro Transportnogo Mashinostroeniya (Transport Industry Design Bureau): tank development center of the Omsk tank plant
KB Tochmash	Konstruktorskoye Biuro Tochnogo mashinostroeniya (Precision Industry Design Bureau) in Moscow
KhKBM	Kharkovskoe Konstruktoskoe byuro po Mashinostroeniyu im. A. A. Morozova (A. A. Morozov Industry Design Bureau in Kharkov), Soviet/Ukrainian tank design bureau at the Malyshev plant in Kharkov
LKZ	Leningradskiy Kirovskiy Zavod (Kirov Plant in Leningrad)
MRD	Motor Rifle Division
MRR	Motor Rifle Regiment
NII Stali	Nauchno Ispytatielniy Institut Stali (Steel Scientific Research Institute), the main Soviet/Russian research institute for tank armor and advanced protection systems
NPO	Nauchno-proizvodstvennoe obedinenie (Research-Production Association), a Soviet industrial organization from the 1970s that combined a design bureau with a manufacturing plant into a single entity.
Obiekt	Object; experimental designation applied to tank designs, used interchangeably with izdeliye (article)
TOW	Tube-launched, Optically tracked, Wire-guided missile
VNII Transmash	Vserossiyskiy Nauchno-Issledovatelskiy Institut Transportnogo mashinostroeniya (All-Russia Scientific Research Institute of the Transport Industry), the main Soviet/Russian tank industry research center in Leningrad/St. Petersburg; VNII-100 up to 1966
ZTM	Zavod Transportnogo Mashinostroeniya; (Transport Industry Plant) No. 13 in Omsk

INDEX

Figures in **bold** refer to illustrations.
Plates are shown with page and caption locators in brackets.

2S7 Pion 203mm self-propelled gun **44**, 45
2S19 Msta 152mm self-propelled gun **43**, 45–46
6TD-2 engine 40
6TD-3 engine 39
9M112M Kobra missiles 12–13, **13**
9M119 Refleks missiles 22–23, **23**, **24**
9M128 Agona missiles 13

Active Protection System (APS) 34, **35**, 35–38
Agava thermal sight 32
Agona missiles 13
Arena Active Protection System (APS) **34**, 36–38
armor
  "Combination K" armor 13–14
  Kaktus explosive reactive armor **40**, 44
  Kontakt explosive reactive armor **15**, 16–18, **18**, 23–25, **36**, **38**
  Nozh explosive reactive armor 40, 42
Aynet system 39

Bagira 140mm gun 42
BREM-80U armored recovery vehicle (ARV) **42**, 45
BREM-84 armored recovery vehicle (ARV) 45
BTMP-84 tank/infantry vehicle 42
Buran-Catherine thermal-imaging night sight 40

camouflage
  T-80B tank **A** (8)
  T-80BV tank **16**, **B** (16)
  T-80U tank **G** (40)
  T-80UD tank **D** (28), **F** (36)
  T-80UK tank **E** (32)
Charomskiy 5TD diesel engine 4
Chechnya (1994) **28**, 30–32
Chelyabinsk tank plant 7, 8, 25, 30
"Chorniy Oryol" 44
Conventional Forces in Europe (CFE) Treaty (1990) 12, 15, 18, 24, 28
Cyprus **31**, 35, **E** (32)

D-68 gun 5, **6**
D-81T Rapira-3 125mm gun 5, 13, 39
diesel engines 25–27
Dikobraz system 36
Drozd system **35**, 35–36

engines
  6TD-2 engine 40
  6TD-3 engine 39
  Charomskiy 5TD engine 4
  diesel engines 25–27
  gas-turbine engines 7–12, **12**, **22**, 26
  GTD-1000T engine 10, **12**, 23, 26
  GTD-1250 engine 34
Explosive Reactive Armor (ERA)
  Kaktus explosive reactive armor **40**, 44
  Kontakt explosive reactive armor **15**, 16–18, **18**, 23–25, **36**, **38**
  Nozh explosive reactive armor 40, 42

Galkin, Colonel-General Aleksandr 32
gas-turbine engines 7–12, **12**, **22**, 26
Gorbachev, Mikhail 27
Grachev, Pavel 32
Great Britain 34
Grechko, Marshal Andrei 11
Grozniy, Chechnya (1994) **28**, 30–32
GTD-1000T engine 10, **12**, 23, 26
GTD-1250 engine 34
guns
  2S7 Pion 203mm self-propelled gun **44**, 45
  2S19 Msta 152mm self-propelled gun **43**, 45–46
  D-68 gun 5, **6**
  D-81T Rapira-3 125mm gun 5, 13, 39
  Type 55L Bagira 140mm gun 42
Gyurza missiles 12

insignia
  T-80B tank **A** (8)
  T-80BV tank **B** (16)
  T-80U tank **G** (40)
  T-80UD tank **D** (28), **F** (36)
  T-80UK tank **E** (32)
Instrument Design Bureau, Tula 22
International Defense Exhibition (IDEX) arms show 40
Izotov, S. P. 8, 10

Kaktus reactive armor **40**, 44
Kharkov tank plant 4, 7, **7**, 11, 19, 25–27, 28, 30, 36, 38–43
Khrushchev, Nikita 8, 12
Klimov Research-Production Association 8
Kobra missiles 12–13, **13**
Kombat missiles 42
Kontakt armor **15**, 16–18, **18**, 23–25
Kontrast system 42
Korzhina autoloading system **14**, 44
Kotin, General Zhozef 8
Kurakin, Boris M. 43

laminated armour 14
Lebanon (1982) 16
Leningrad Kirov tank plant (LKZ) 6–7, 8, 11, 14, 18, 19, 25, 30, 43, **44**, 45
Luch Design Bureau, Kiev 42

Malyshev plant 38
markings
  T-80B tank **A** (8)
  T-80BV tank **B** (16)
  T-80U tank **G** (40)
  T-80UD tank **D** (28), **F** (36)
  T-80UK tank **E** (32)
missiles **22**
  9M112M Kobra missiles 12–13, **13**
  9M119 Refleks missiles 22–23, **23**, **24**
  9M128 Agona missiles 13
  Gyurza missiles 12
  Kombat missiles 42
  S-300V air defense missile system **45**, 46
Morocco 34
Morozov, Aleksandr 4, 11
Msta 152mm self-propelled gun **43**, 45–46

Naval Infantry, Soviet 35
Nepobidimy, S. P. 12
Nizhni-Tagil tank plant 30, 32, 35
North Atlantic Treaty Organisation (NATO) 5, 14, 25, 28, 32, 34
Nozh reactive armor **38**, 40, 42
Nudelman, A. E. 13

Obiekt 216: **44**, 45
Obiekt 219: 10–13, **18**, **22**, **23**, **24**, **26**
Obiekt 292: 43
Obiekt 316: 45–46
Obiekt 430: 4–6
Obiekt 450: 7, **7**
Obiekt 476: 19–22
Obiekt 477: 43
Obiekt 478: 26–27, 39, 40, **F** (36)
Obiekt 640: **40**, 44
Obiekt 800: **45**
Omsk tank plant 14–15, 24, 25, 28, 30, **30**, 32, 34, 35, 39, 43–45

Pakistan 38–39, **F** (36)
Petrov, F. F. 5
Pion 203mm self-propelled gun **44**, 45
Popov, N. S. 8

radar 35–38, **45**
Rapira-3 125mm gun 5, 13, 39
Refleks missiles 22–23, **23**, **24**
Romanov, G. V. 10
Rossel, Eduard 32

S-300V air defense missile system **45**, 46
self-propelled guns
  2S7 Pion 203mm self-propelled gun **44**, 45
  2S19 Msta 152mm self-propelled gun **43**, 45–46
Shater system 36
Shomin, Nikolai 19
Shtora system **27**, **30**, **31**, 34, 39
South Korea 34–35
Soviet Union, collapse of (1991) 28–35
Steel Scientific Research Institute 14
Sweden 34

T-64 tank 4–6, **6**, 10–13, 19
T-72 Ural tank 6, 11, 19
T-74 tank 7, **7**
T-80 Standard tank **10**
  origins of 4–12
  the Soviet Collapse (1991) 28–35
  T-80B tank **11**, **12**, 12–15, **14**, **18**, 36, **A** (8)
  T-80BV tank **15**, **16**, 16–18, **28**, 30–31, **B** (16), **C** (21–22)
  T-80U tank **5**, **19**, 19–25, **22**, **24**, **25**, 38, **G** (40)
  T-80UD tank 25–27, 30, 39, **D** (28), **F** (36)
  T-80UK tank **30**, **31**, 32–34, **E** (32)
  T-80UM tank **34**, **35**
T-84 tank **38**, 38–43, **39**
T-90 tank 32
TPN-4 Buran night sight 39
Transdizel Special Design Bureau, Chelyabinsk 25
Transport Industry Design Bureau (KBTM) 43–45
Turkey 40, 42
turret 13–14, 19, **36**, 39, **40**, 44
Type 55L Bagira 140mm gun 42

Ukraine 38–43
United States 43
Uraltransmarsh Dedign Bureau, Sverdlovsk 45–46
Ustinov, Dmitriy 11, 12, 25–26

V-46 diesel engine 26

weapons *see* guns; missiles

Yeltsin, Boris 30, **D** (28)
Yom Kippur war (1973) 11

Zaslon program 42

RELATED TITLES

New Vanguard
Osprey
T-72 Main Battle Tank 1974–93

NVG 006 ▪ 978 1 85532 338 4

New Vanguard
Osprey
IS-2 Heavy Tank 1944–73

NVG 007 ▪ 978 1 85532 396 4

New Vanguard
Osprey
T-34 Medium Tank 1941–45

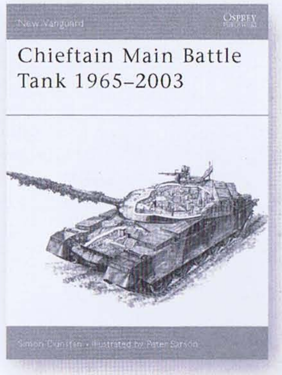
NVG 009 ▪ 978 1 85532 382 7

New Vanguard
Osprey
KV-1 & 2 Heavy Tanks 1939–1945

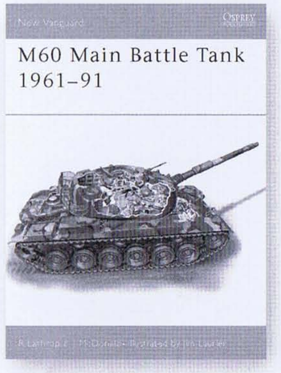
NVG 017 ▪ 978 1 85532 496 1

New Vanguard
Osprey
T-34-85 Medium Tank 1944–94

NVG 020 ▪ 978 1 85532 535 7



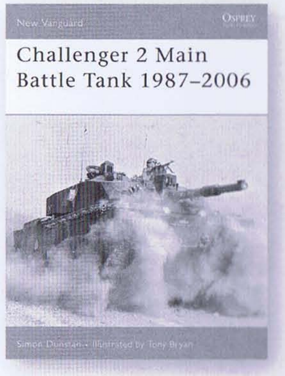
NVG 080 ▪ 978 1 84176 719 2



NVG 085 ▪ 978 1 84176 551 8

New Vanguard
Osprey
T-54 and T-55 Main Battle Tanks 1944–2004

NVG 102 ▪ 978 1 84176 792 5



NVG 112 ▪ 978 1 84176 815 1

VISIT THE OSPREY WEBSITE

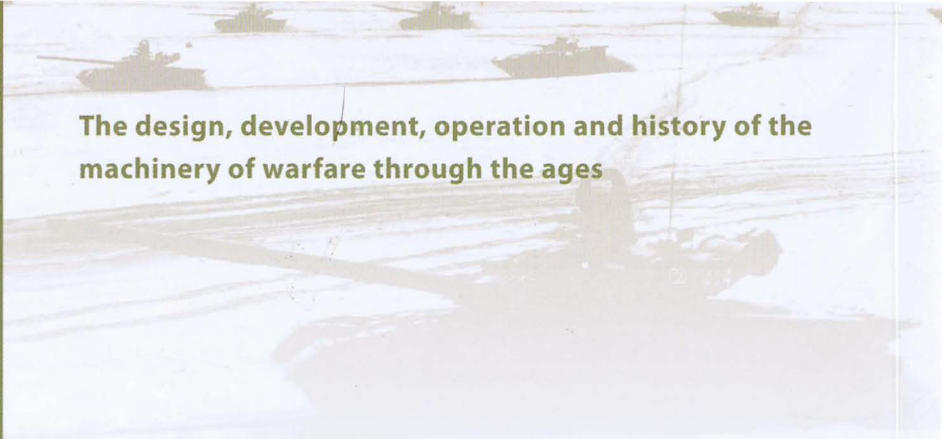
Information about forthcoming books ▪ Author information ▪ Read extracts and see sample pages ▪ Sign up for our free newsletters ▪ Competitions and prizes ▪ Osprey blog

www.ospreypublishing.com

To order any of these titles, or for more information on Osprey Publishing, contact:

North America: uscustomerservice@ospreypublishing.com
UK & Rest of World: customerservice@ospreypublishing.com

NEW VANGUARD • 152



The design, development, operation and history of the machinery of warfare through the ages

T-80 STANDARD TANK

The Soviet Army's Last Armored Champion

The T-80 Standard Tank was the last tank fielded before the collapse of the Soviet Union, and the most controversial. Despite having the most sophisticated fire controls and multi-layer armor ever fielded on a Soviet tank, its turbine power plant (rather than a conventional diesel) remained a source of considerable trouble throughout its career.

Steven J Zaloga charts the little-known history of the T-80, covering the initial construction, through the development to the subsequent variants – the T-84 and Russia's enigmatic "Black Eagle Tank." Accompanying detailed cutaway artwork illustrates the unusual design features that made the T-80 so controversial.

Full color artwork ▪ Illustrations ▪ Unrivaled detail ▪ Cutaway artwork

US $17.95 / CAN $19.95
ISBN 978-1-84603-244-8

OSPREY
PUBLISHING

2009

WWW.OSPREYPUBLISHIN